DECEMBER 10, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

1 Million Starts in 1957 ?

Tight money will curtail new housing next year. FHA's boost in rates won't aid borrowers much . . . page 97

✔ Titanium Extrusions —page 142

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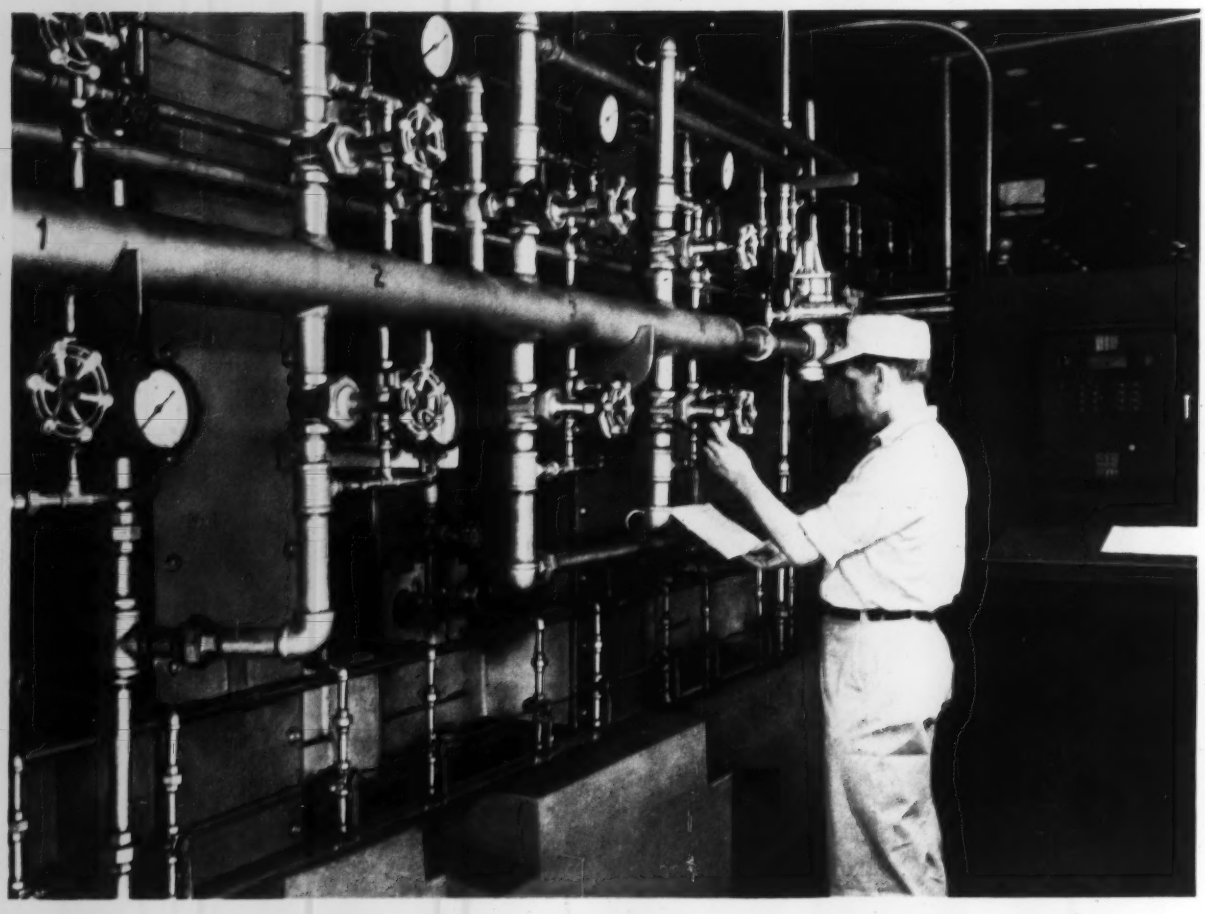


TUBING MACHINABILITY STARTS HERE

Machinability can be a critical factor in the economical production of mechanical parts from tubing. This important characteristic of many alloy steels is largely determined by various types of heat-treatment. That's why uniform tubing machinability requires *precise control* of the heating and cooling cycle of the heat treating operation.

John Fencil, a furnace operator, is shown at work on one of the many heat treating furnaces at B&W. By regulating the 128 burners, 22 flues and 145 valves on this specially designed furnace he can completely control the heat treating cycle. Specialized furnaces such as this and trained operators like John assure that B&W alloy mechanical tubing is uniformly heat treated for economical parts production. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W
TUBULAR PRODUCTS DIVISION

TA-6042M

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

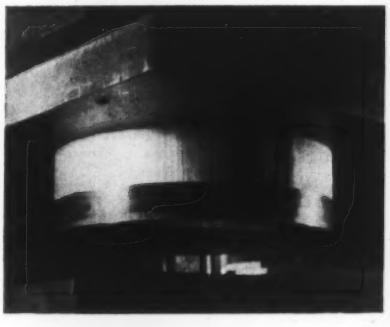
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Good Results with BTR Hollow-Bar in Manufacture of Fan Housing

Based upon all-around performance — less time spent in machining, good resistance to wear, and ease of heat-treatment — dies of BTR (Bethlehem Tool Room) Hollow-Bar rang the bell recently at Electrolux Corp., Old Greenwich, Conn.; the steel was supplied by Lindquist Steels, Inc., Bridgeport, Conn.

The dies, hardened to approximately Rockwell C 60, and operating in a 100-ton press, formed fan housings from 25-gage zinc-coated sheet steel at the rate of more than 1600 pieces per hour. Redressing was required once every two months or so, and then no more than 0.010 in. was removed.



BTR Hollow-Bar is made from our oil-hardening tool steel by a process called high-speed trepanning. By this method, we take hammer-forged round bars, core the inside diameter, then give them a rough-turning on the outside.

With BTR Hollow-Bar there's no need to run up shop costs waiting for delivery of forged rings or dises. Instead, this fine tool steel comes to you ready to go, with no need for drilling, rough-boring, rough-facing or rough-turning.

Your Bethlehem tool-steel distributor will be glad to explain how BTR Hollow-Bar can be of real service to you. Or a phone call or letter to the nearest Bethlehem sales office will bring you detailed information promptly.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Remove all the "Bark" from Liquid-Quenched Tools

Most users of tool steel realize that it is necessary to remove the "bark" (scaled and decarburized outer surface) from tool-steel bars in order to obtain full, uniform hardness in heat-treatment. If this area is not removed, low hardness will result because of the low carbon content of the decarburized metal. It is not always recognized that this procedure is necessary on tools which are to be liquid quenched, even though portions of the tool do not constitute working surfaces.

If tools are to be liquid quenched, all the bark must be removed to avoid excessively high quenching stresses which could cause cracking of tools during hardening. Low carbon areas on the surface transform during hardening at a different time than the higher carbon interior. This sets up additional stress which, added to the high thermal stresses from quenching, could cause cracking. Air-hardened tools can tolerate bark on non-working areas because of the low hardening stresses in air hardening. But with liquid-quenched tools there are no exceptions — remove all the bark.

TOOL STEEL MOVIE WINS ANOTHER AWARD

"Teamwork," Bethlehem's new motion picture on tool steel, received a second film award, a silver reel symbolic of excellence, at the recent American Film Assembly competition in Chicago.

The 16-mm, 30-minute color film explains the manufacture, quality control and heat-treatment of Bethlehem tool steels. It is available for showings to machinists, heat-treaters, die makers and tool manufacturers. To see the film, write to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

Moving your plant out of town?

If you are locating beyond the gas mains, install a

PHILGAS* System for clean, dependable heat at all times . . . for all kinds of heat-treating jobs.

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A Philgas system is easy to install . . . requires little capital investment. It is automatic in operation. Find out how Philgas can help in your business, for heat-treating, space heating in your plant, and as a motor fuel for your trucks and heavy duty equipment. Write for full information. You can save money and trouble with Philgas . . . America's largest selling LP-Gas!

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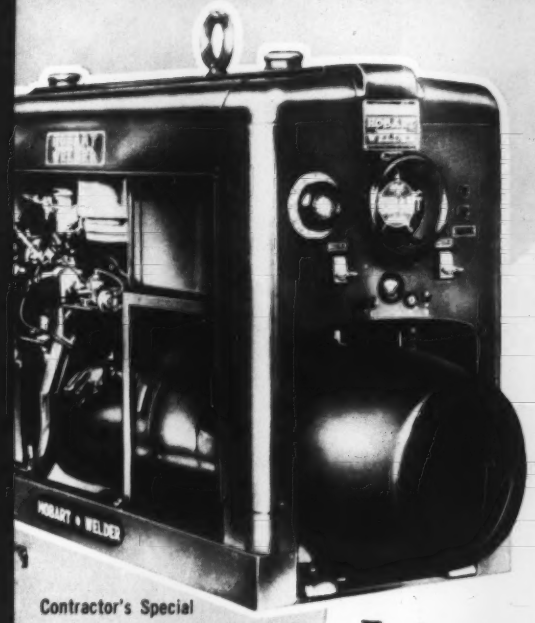
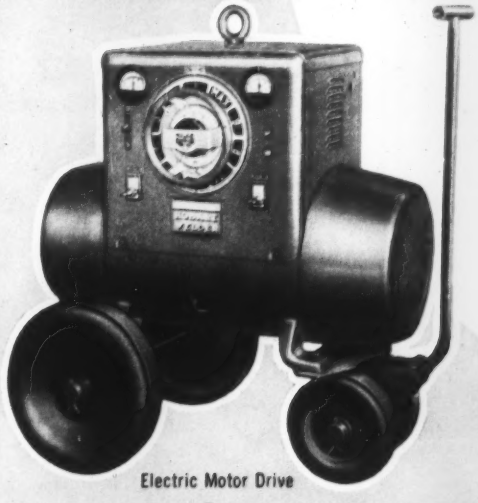


Contractor's Special

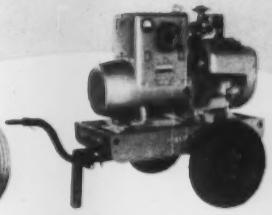
engine drive or electric drive



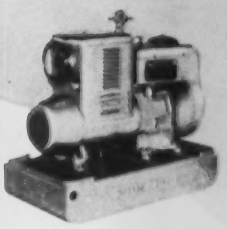
Electric Motor Drive

HOBART TROY OHIO WELDERS

Standard Road Trailer



AC Welder/AC Power



Air Cooled Husky Boy

New developments—new convenience features and a new ease of handling come with these new gas drive welders. Get faster, lower cost welding with units designed and built for today's heavy work schedules. Air cooled or water cooled, with or without auxiliary power for running tools, lights, motors, etc.—all ready on a moment's notice to go to work for you.

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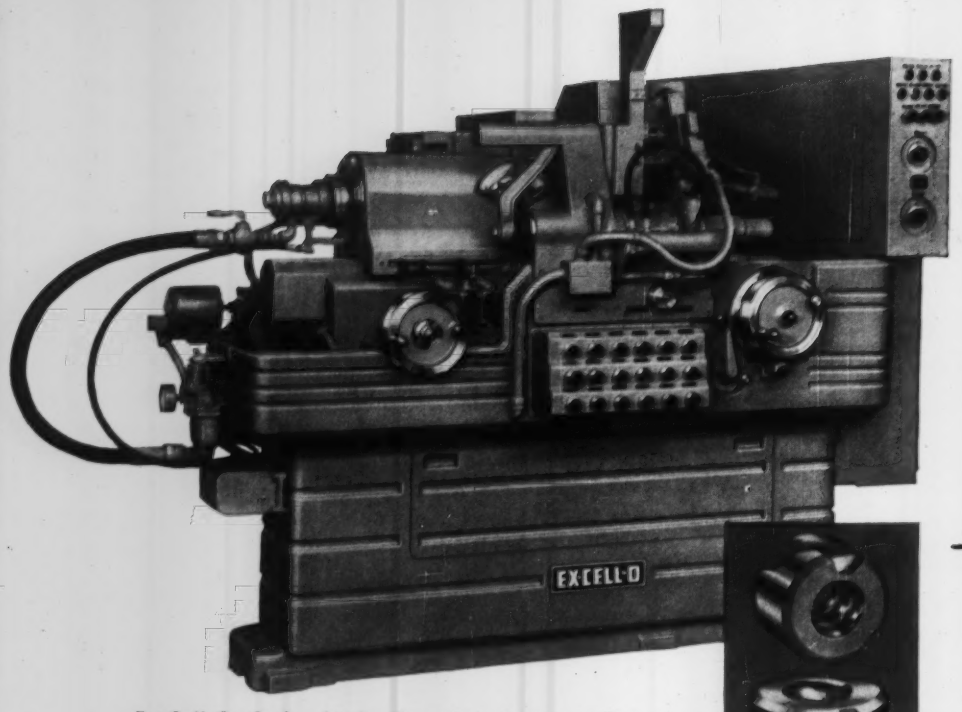
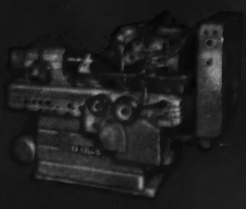


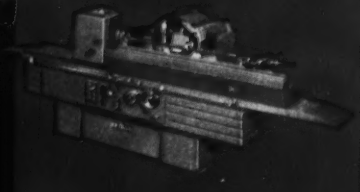
Ex-Cell-O Style 39-A Precision Internal Thread Grinder equipped with automatic work handling equipment. This machine loads, locates, grinds threads and ejects steering gear ball nuts in a completely automatic cycle.

EX-CELL-O
Thread Grinders
Manual – Automatic – Automated



EX-CELL-O STYLE 33 FOR EXTERNAL THREADS. An accurate production machine, automatic except for loading, unloading, and moving the cycle lever. Can be arranged for tapered grinding and for eccentric relief grinding.

EX-CELL-O STYLE 36 FOR LONG EXTERNAL THREADS, also available with internal attachment. A high production machine with easily adjusted work cycles.



EX-CELL-O STYLE 50. A versatile machine for external work . . . also available with internal attachment.

EX-CELL-O STYLE 120. Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

These standard machines are grinding thread gages, machine tool lead screws, innumerable aircraft parts, automotive steering mechanisms and pinions, worms, taps, and many similar workpieces.

Precision thread grinders in this Ex-Cell-O line range from manually-operated models, for toolroom and for short runs, to high production automatics, to styles equipped with automatic work handling equipment. There are five models designed to meet your every requirement.

For specific information on thread grinder operations or a quotation on a machine for your requirements, call your local Ex-Cell-O representative or write Ex-Cell-O in Detroit.

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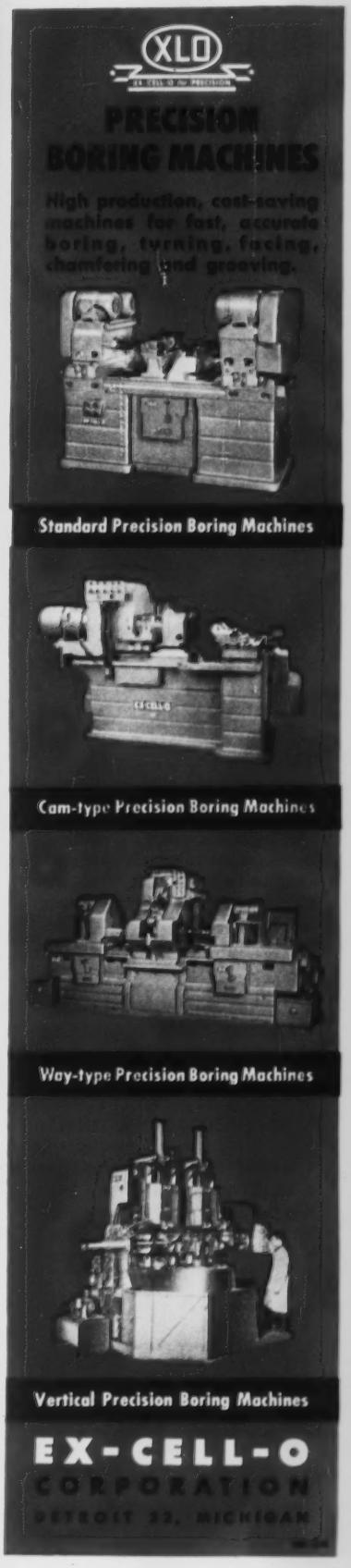
Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U.S. and possessions, and Canada, $10 a year; all other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.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Dust causes wear, damages bearings, bedways, slides and saddles and other "sensitive" machine parts. Clean machines hold close tolerances better and need re-grinding or alignment only ¼ as often. In five years, users of Torit dust collectors save up to $1,600 in re-grinding the ways of the average grinder—and save hundreds of dollars *more* in down-time.

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behind the scenes

A Heap of Living

Great grandpappy Shrd (a dozen or so millenniums removed) leaned forward and patted his wife's mother gently between the ears with a beautifully carved mastodon tusk.

"It's the finest cave in the whole valley, you bletherin' old bat," he declared gently, waving the tusk like a wand, and pointing out the more desirable features of the family's new home. "Southern exposure, running water right outside the door, a natural draft and some nice soft sandstone ledges to sleep on. How can you compare this with that awful hole we rented from your brother?"

"And what has this place got, pray tell?" inquired the bletherin' old bat. "A big family of stinking Neanderthals directly upwind, that's what. Worse than that, this is a hyena cave you've dragged us into, and you haven't even cleaned 'em all out, yet."

Shrd instantly coined an expression that was to become part of everyday speech thousands of years later. "You can say that again," he murmured.

"Running water right outside the door!" snorted the bat. "I fell in and nearly drowned—and don't tell me it was too bad I didn't. Why my daughter married you is something I'll never know. When her poor father was alive—"

"When her poor father was alive," Shrd interrupted, "you all lived in a muddy hole that wasn't fit for a badger. There was no comfort, no conveniences and you couldn't get in or out without crawling over a pile of garbage. Now, in our new home we got so many improvements they'll make you dizzy. For a start, we have a hyena garbage disposer—"

Big Housing Market

Well, the new home of today would really send Shrd and his happy little family. Indeed, today's home represents not only finer living: It also represents a solid bulwark of our national economy. American housing has improved and expanded so much since World War II it is almost too difficult to comprehend in one easy lesson. The story about the housing phenomenon and metalworking's stake in it (page 97) will set you atwitter. In garbage disposers alone, the amount of metal that has replaced hyenas would serve to sink a ship. Producers of iron, steel, brass, copper, zinc, tin, lead, bronze and aluminum regard housing with love and affection because it is an insatiable consumer of their products.

In the article, STEEL guesses that next year will see a million housing starts—and you can see for yourself how much business that will mean to manufacturers of everything from garbage grinders to toasters.

Old World Notes

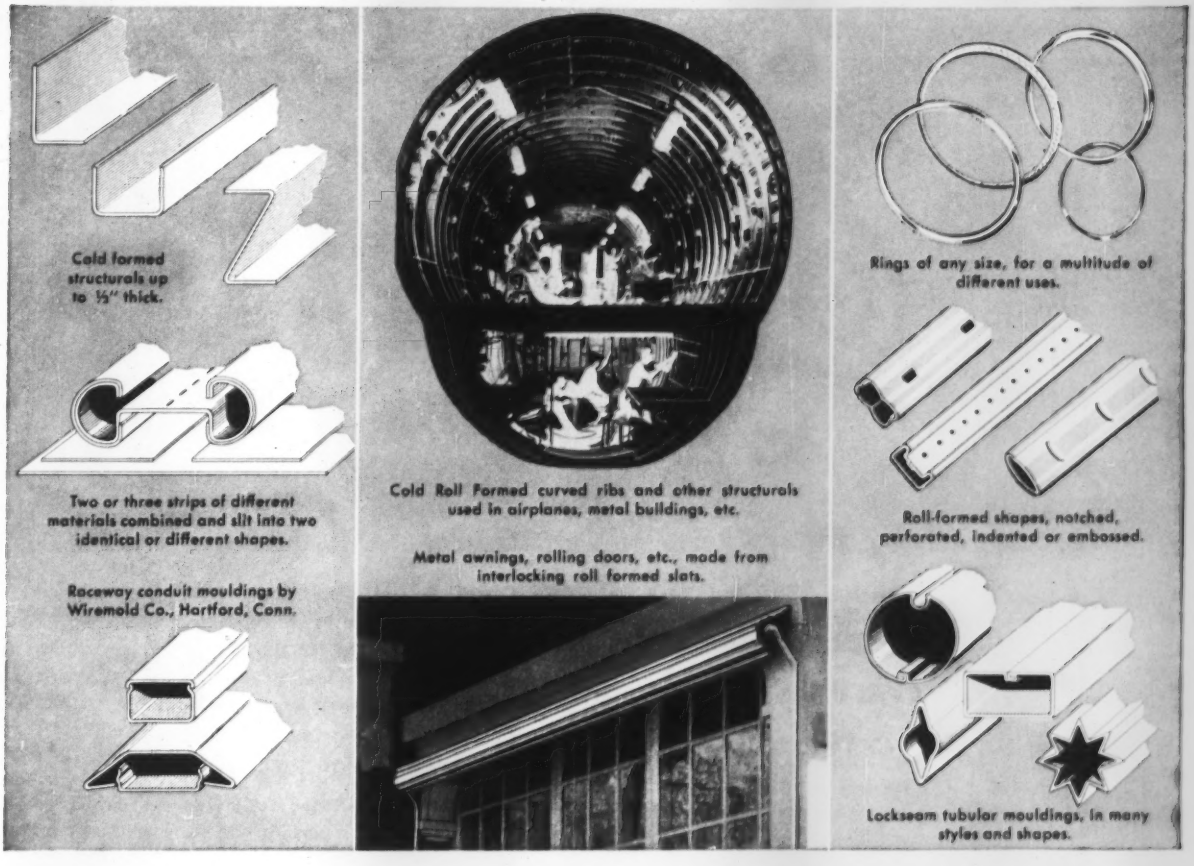
As the year comes to an end, STEEL usually devotes space in the final four issues to a metalworking summary of Europe. This week the editors begin with Sweden and Italy, tossing facts and figures about with the assurance born of solid research . . . and the fact that they have a link with Europe in the person of STEEL's European manager, Vincent Delport. Perhaps the story (page 108) doesn't reveal everything that is going on in Safsjostrom and Giudianova, but it doesn't miss much in Stockholm or Milan. Those of us who are inclined to write off European metalworking with a yawn will be surprised.

Slippery Joe

Pappy's chain didn't scare anybody; you all figured $1.40 as the correct answer, basing your calculations on the assumption that Pappy used the links from one section of chain to link the other five sections. Time now to resurrect another ancient one. Bathing in a certain sacred Chinese lake was punishable by death, but the head priest decreed that anyone fetched out of the lake was to be given the privilege of deciding whether he should be boiled alive or eaten by a tiger. Moreover, he was permitted to make a statement—if it were false, he was to be thrown into the pot; if it were true, he was to be tossed to the tiger. A man named Joe was caught swimming in the sacred lake. How did he beat the rap?

Shrdlu

(Metalworking Outlook—Page 91)


Cold formed structurals up to ½" thick.
Two or three strips of different materials combined and slit into two identical or different shapes.
Raceway conduit mouldings by Wiremold Co., Hartford, Conn.
Cold Roll Formed curved ribs and other structurals used in airplanes, metal buildings, etc.
Metal awnings, rolling doors, etc., made from interlocking roll formed slats.
Rings of any size, for a multitude of different uses.
Roll-formed shapes, notched, perforated, indented or embossed.
Lockseam tubular mouldings, in many styles and shapes.

1001 Things Now Being Done By COLD ROLL FORMING

• The basic function of a Yoder cold roll forming machine is, of course, to convert flat rolled strip or sheets at high speed into mouldings, panels, tubular, channel and other shapes.

Quite often, these shapes need further elaboration before being ready for assembly or installation. They may, for instance, have to be curved, coiled or made into rings. Or they may need to be perforated at certain intervals of spacing, notched, embossed, or otherwise finished by additional operations. You may want to combine two or more materials into a finished shape, such as carbon steel with stainless, felt, wood, etc.

These and many other things can be done with Yoder machines at little or no extra cost over and above normal conversion costs, simply by providing special attachments, or by auxiliary units installed in line with the forming mill.

So, to the recognized high economy of the cold forming operation itself, other important production economies may be added. Yoder engineers are at your service in designing equipment of this kind.

The Yoder Book on Cold Roll Forming is a complete text, profusely illustrated, on the art and its scope, the machines, their tooling and application to a multiplicity of mass production needs. A copy is yours for the asking.

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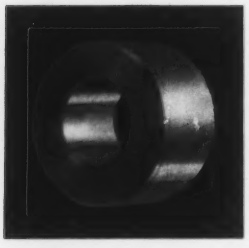


BARBER-COLMAN offers

Close control of size and finish

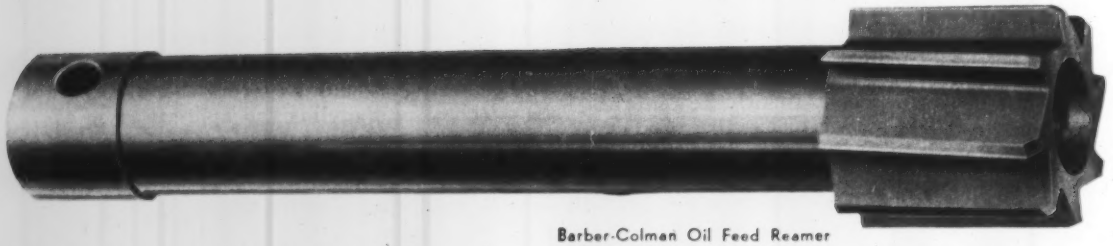
Consistent duplication of accuracy

Minimum finishing stock

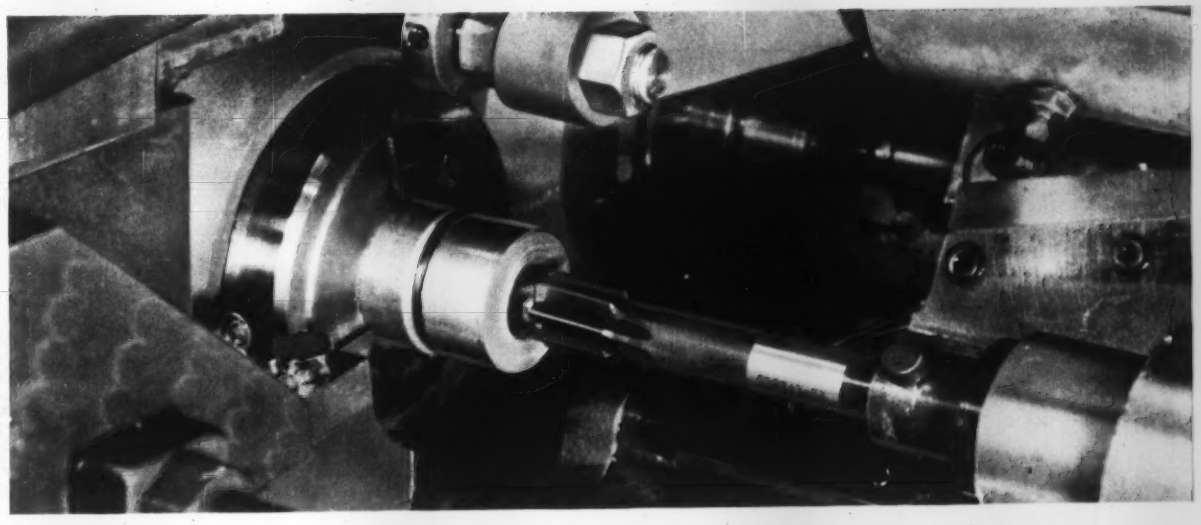
Fewer finishing operations

Important job economies are being obtained in hole finishing operations with Barber-Colman standard "oil feed" reamers. Close control of size and finish reduces the number of finishing operations required and results in shorter finishing time. Because reamer diameters are held to a tolerance of +.0002", —.0000", reamers can be drawn from stock and put to work immediately on the machines, with assurance of consistent hole accuracy. This eliminates the usual machine downtime for hand working the reamers and size checking.

Through careful tool design and accurate sharpening, reamers are made to suit the specific job characteristics, so that better cutting action produces fewer stresses, and



Barber-Colman Oil Feed Reamer



consequently less distortion in heat treating. As a result, less finishing stock is required for honing after hardening.

Cost savings benefits such as these are evidenced in the Barber-Colman "oil feed" reamers used to size bores in planetary gear blanks. Blank bores are finished within .7536"/.7543" I.D. to 15-60 rms. Since reaming produces blanks within the close tolerances required for accurately cutting the gear teeth, a series of successive finishing operations formerly required have been eliminated, greatly reducing cost per finished hole. Minimum stresses produced as a result of reaming confine heat treating distortion to normal shrinkage of the hole. Consequently, in this case, the hole is reamed to final size, and it is only necessary for honing to remove the amount of shrinkage. The job facts as shown illustrate the production accuracy and finish obtained:

Barber-Colman reamer design produces sharp cutting edges with positive primary clearance on the land, rather than a cylindrical land, to provide a shearing action cut. These sharp edges with irregular flute spacing produce smooth cutting with uniform finish and accuracy which cannot be obtained with conventional reamers. These reamers also have a slight right hand helical flute with an oil hole drilled through the center of the reamer so that the cutting oil will force the chips back between the flutes, contributing to fine finish.

Semi-Finished Bore Diameter	.7536" .7543"
Maximum Taper Allowable	.0001"
Bore Square and Parallel with Face of Blank	.0003"/.0005"
Concentricity with O.D.	.002"
Production	200 Blanks per Hour
Cutting Time	17 Seconds
Cutting Speed	302 rpm.
Stock Reamed	.008" to .009"
Finish	15-60 rms.
Bore Depth	.820"
Feed	.025"

When you have hole finishing problems involving close limits of accuracy and a series of operations, call a Barber-Colman reaming expert and talk over with him the most economical way to get the finish and accuracy you want. You will find substantial production savings possible, both in cost and time.

BARBER-COLMAN COMPANY

9912 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

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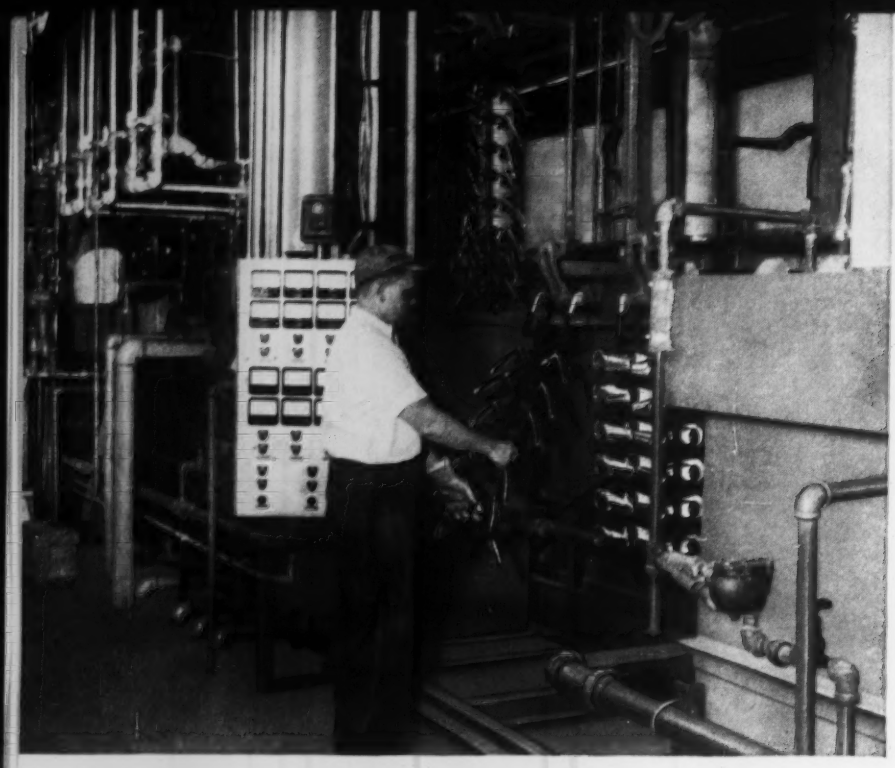

CUT YOUR PLATING TIME WITH THESE UDYLITE PROCESSES

HI-C Processes Give Faster Nickel Plate on Die Cast or Steel Parts

In plating some 5000 die cast and steel parts per hour, Rival Manufacturing Company of Kansas City, Missouri, use Udylite 514 HI-C and 31 HI-C bright nickel processes in combination with two Udylite Full Automatic Plating Machines.

The HI-C (high chloride) baths give faster bright nickel plate than any processes ever developed and at the same time brighter, more ductile and smoother nickel finishes. They are developments of the Udylite Research Corporation and are the only bright high chloride baths available commercially.

The HI-C processes plate nickel perfectly over copper for die cast parts and provide the important underlay for the final chrome plated finish. They are also used by Rival as the basic coating on steel before the chrome is applied.

As every electroplater knows, where the cycles of copper, nickel and chrome plating are used, nickel plating is the most time consuming. Therefore, Udylite's development of HI-C for speeding up the nickel cycle is of prime importance.

The use of Udylite Full Automatics by Rival has greatly increased efficiency and economy. Only one man is required to inspect the parts and operate each machine. Now there is complete coordination between fabricating, finishing and assembly. HI-C processes and the controlled time cycle of plating have improved the quality of finish and greatly reduced rejects.

A Udylite HI-C nickel process and a Udylite Automatic Plating Machine will save time, money and improve your product. Let us tell you how. Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

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LETTERS
TO THE EDITORS

Gray Market in Steel? Yes!

In your Metalworking Outlook column of Nov. 26 (page 51), you refer to the gray market in steel in the paragraph, "Gray Market in Steel? Not Yet."

We take exception to this paragraph as we have received any number of telephone calls, especially on structural steel, offering beams for as high as $14.95, f.o.b. Pittsburgh.

We are a small job and heavy metals fabricating shop and have run into the premium prices on steel time and time again. The price offered is more than the difference between those of the mill and warehouse, as referred to in the Metalworking Outlook.

In most jobs, we are able to set back the completion date if there is a shortage of steel. It has been our policy not to purchase the higher priced or premium priced material.

We are notifying you of our experience in this field so that your editors can be appraised of the situation.

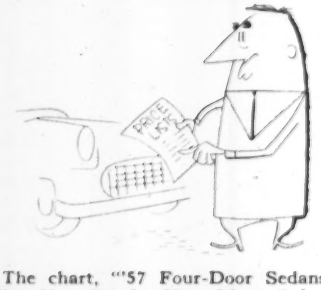
M. F. Umbreit
Optenberg Iron Works
Sheboygan, Wis.

ASM Reviews STEEL Article

The article, "Another Look at Nitriding" (Aug. 20, page 134)—which was reviewed in the article abstracts put out by the American Society for Metals—is interesting to us. We would appreciate receiving a copy for our technical file.

B. A. Schwartz Jr.
Elechem Corp.
Cleveland

Auto Price Chart Lauded



The chart, "'57 Four-Door Sedans—What You Get for Your Money" (page 114), in the Mirrors of Motordom column of Nov. 19 is much appreciated. It gives the average man a chance to check prices on the automobile he intends to buy.

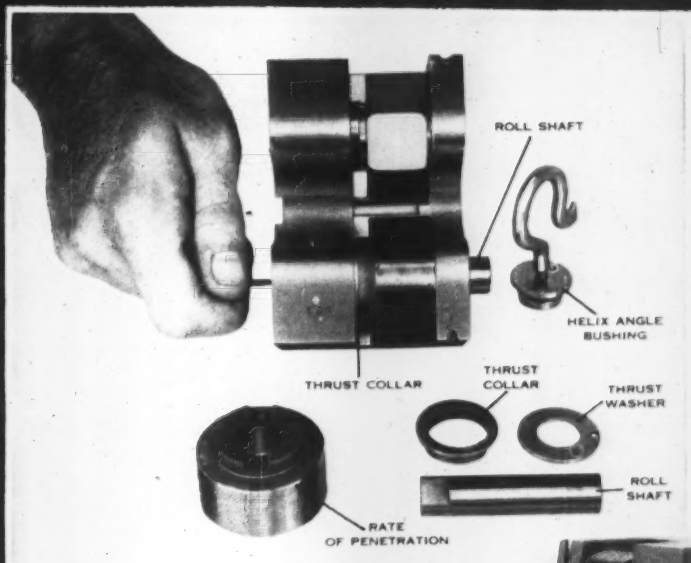
Is the price the buyer should be charged at the dealer's showroom the one your chart shows, plus freight and other optional equipment?

V. M. Hoppe
919 Gardner
Poplar Bluff, Mo.

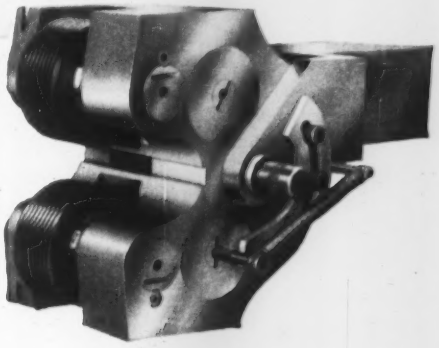
• *As stated at the bottom of the chart,* STEEL's *price list does not include state and local taxes or transportation charges. These, plus the cost of optional equipment, are added to the cost of the automobile by the dealer.*

Since the factories don't directly con-

(Please turn to page 12)



The helix angle bushings, thrust collars, and thrust washers provide a corrective between the workpiece and roll helixes, eliminating drunkenness and ensuring coarse pitch threads to Class 4 fit. All helix angle equipment is designed and marked for rapid changes. This arrangement together with design features allowing infinite size adjustment without loss of rigidity assures rolling all threads as though the attachment were exclusively engineered for that particular work.



Coarse Pitch Threads Rolled to Class 4 Fit..

The LANROLL Thread Rolling Attachments offer features designed to ensure greater accuracy, flexibility and economy when producing threads . . .

1. *PERFECT HELIX AGREEMENT* allows rolling coarse pitch threads to Class 4 tolerances with long roll life. Threads can also be rolled directly to a shoulder with safety.
2. *ADJUSTABLE DESIGN* provides wide range coverage for each attachment size without loss of rigidity.
3. *SUITABLE SIZES* of LANROLL Attachments have been designed for all types and sizes of automatic screw machines and turret lathes with power feed.
4. *RAPID AND PRECISE SET-UPS* are possible with special gaging methods designed for easy use and the elimination of "cut-and-try" setups.
5. Five sizes of Attachments roll a wide range of threads:
   #14—#5 to ⅜"; #18—#5 to ½"; #20—⅜" to 1"; #22—⅝" to 1¼"; #24—¾" to 1¾"

Other outstanding advantages of these LANROLL Attachments include: large diameter rolls for longer roll life; taper correction; and excellent thread finish and microstructure. For additional information ask for Bulletin G-96—please send specifications when writing.

LANDIS *Machine* COMPANY

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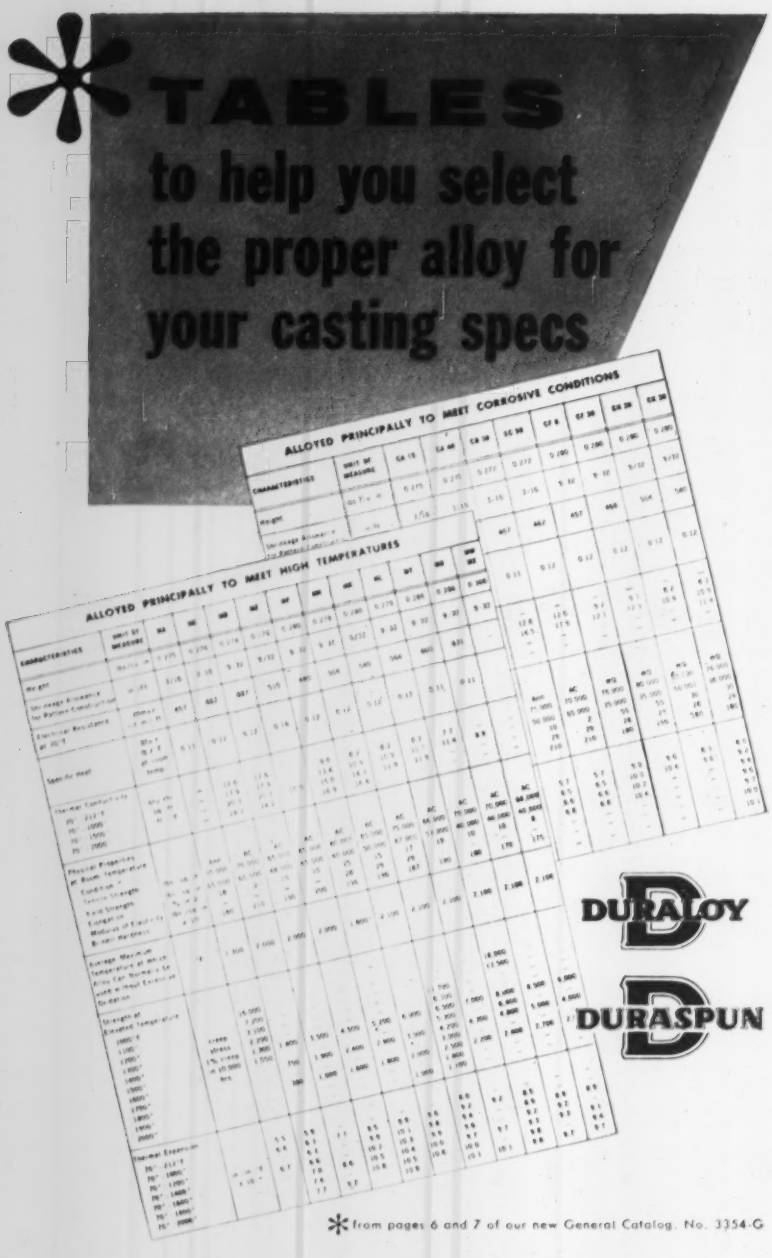
424



*from pages 6 and 7 of our new General Catalog. No. 3354-G

— and there's lots more useful information about high alloy castings in our up-to-date catalog describing Duraloy Service. SEND FOR YOUR COPY.

As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.

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LETTERS

(Concluded from page 10)

trol what dealers charge, pricing usually boils down to what the market will bear.

We suggest you use the list as a comparative guide. If the price is abnormally high after adding state and local taxes, check several other dealers who handle the same make.

Gas Content in Metals

In the article, "Gases in Metals" (Oct. 8, page 95), there is a description of a vacuum-fusion process for determining gas content.

I would appreciate further information on this process and its apparatus. Is the apparatus manufactured for sale? If so, who is the manufacturer?

Albert F. Fengler
Methods Engineer
Machlett Laboratories Inc.
Springdale, Conn.

• *Write: Manley W. Mallett, Consultant, Thermal Chemistry Group, Battelle Memorial Institute, Columbus, O.*

Plants in Washington

The paragraph, "Washington: Industrial Center?", in the Windows of Washington column of Sept. 10 (page 106), was most interesting.

From whom can I secure the list of manufacturing companies located in the Washington area?

Gene Artinger
1324 Stonewood Road
Baltimore

• *Write: Washington Board of Trade, Economic Development Department, 1616 K St. N.W., Washington, D. C. The price is $1.*

Profit Sharing Information

The article, "Profit Sharing Moves In" (page 105, Nov. 19), mentions a set of reference works on profit sharing which was used by the United Steelworkers of America before negotiations took place with the major steelmakers.

We would appreciate information on where we can obtain it.

R. D. Brown Jr.
Vice President
Eastern Steel Tank Corp.
Flushing, N.Y.

• *It is available from the Profit Sharing Research Foundation, 1718 Sherman Ave., Evanston, Ill., at a cost of $29.50. Mr. J. J. Jehring is the foundation's director.*

For further information about profit sharing, write the Council of Profit Sharing Industries, 337 W. Madison St., Chicago 6, Ill. Mr. Joseph B. Meier is executive secretary.

Comprehensive List of Alloys

We have received a copy of the Metal Selector (insert in Oct. 1 issue), which we believe to be the most comprehensive list of alloys to be published in pamphlet form. We would appreciate six additional copies.

M. DeGrande
Crucible Steel Co. of America
Chicago

We would like to have 75 copies of this insert to pass out to clients who are metal users. It seems to be an excellent reference medium, and you are to be complimented upon its complete and concise form.

M. M. Mossman
Sales Agent
Seattle

AS ALWAYS . . . The Year 1957

Will Find Heyl & Patterson

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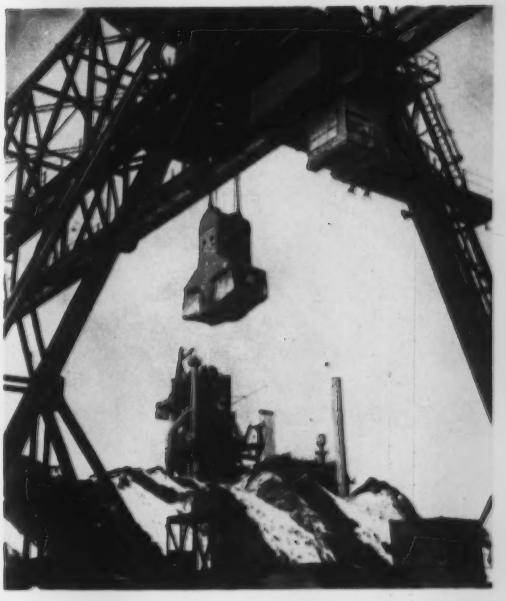
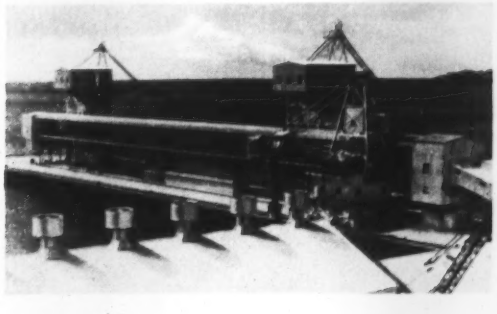
WITH THE BEST



We at H&P blend progressive and imaginative design with technical and manufacturing experience gained from 70 years of designing and building dependable

BULK MATERIALS HANDLING EQUIPMENT.



All the way from design to erection, we function as a team dedicated to the task of making your material handling a successful and low cost operation. Thus we meet our responsibility as a leader in our field . . . with efficiency and dependability built into every piece.

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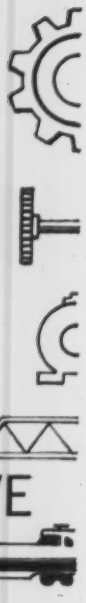

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Please rush my copy of your newest booklet entitled, "The Key to Rust Prevention," which tells about the problems of rust, cleaning my products, materials in corrosion preventives and how to choose a rust preventive.

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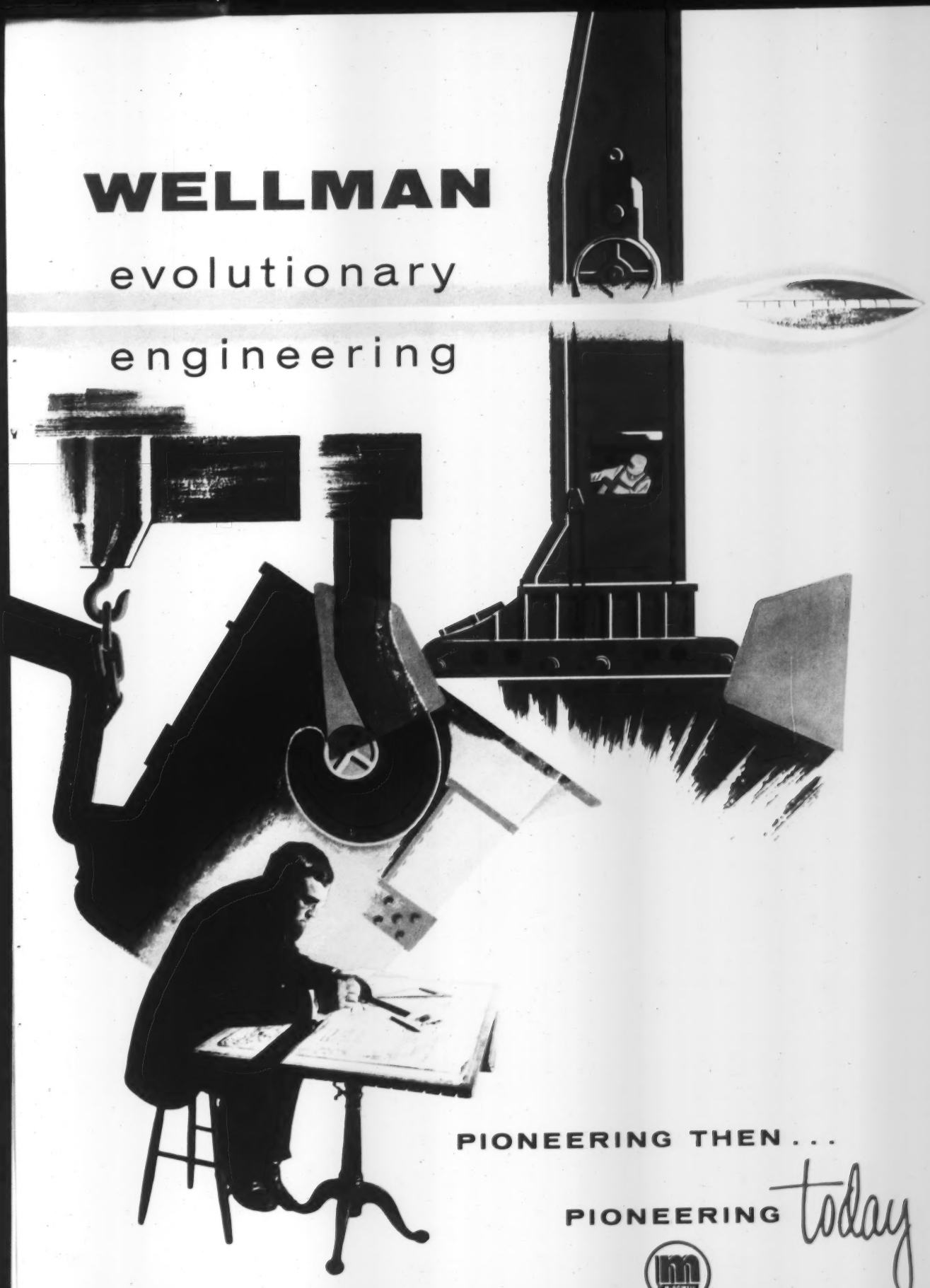


PIONEERING THEN . . .

PIONEERING *today*

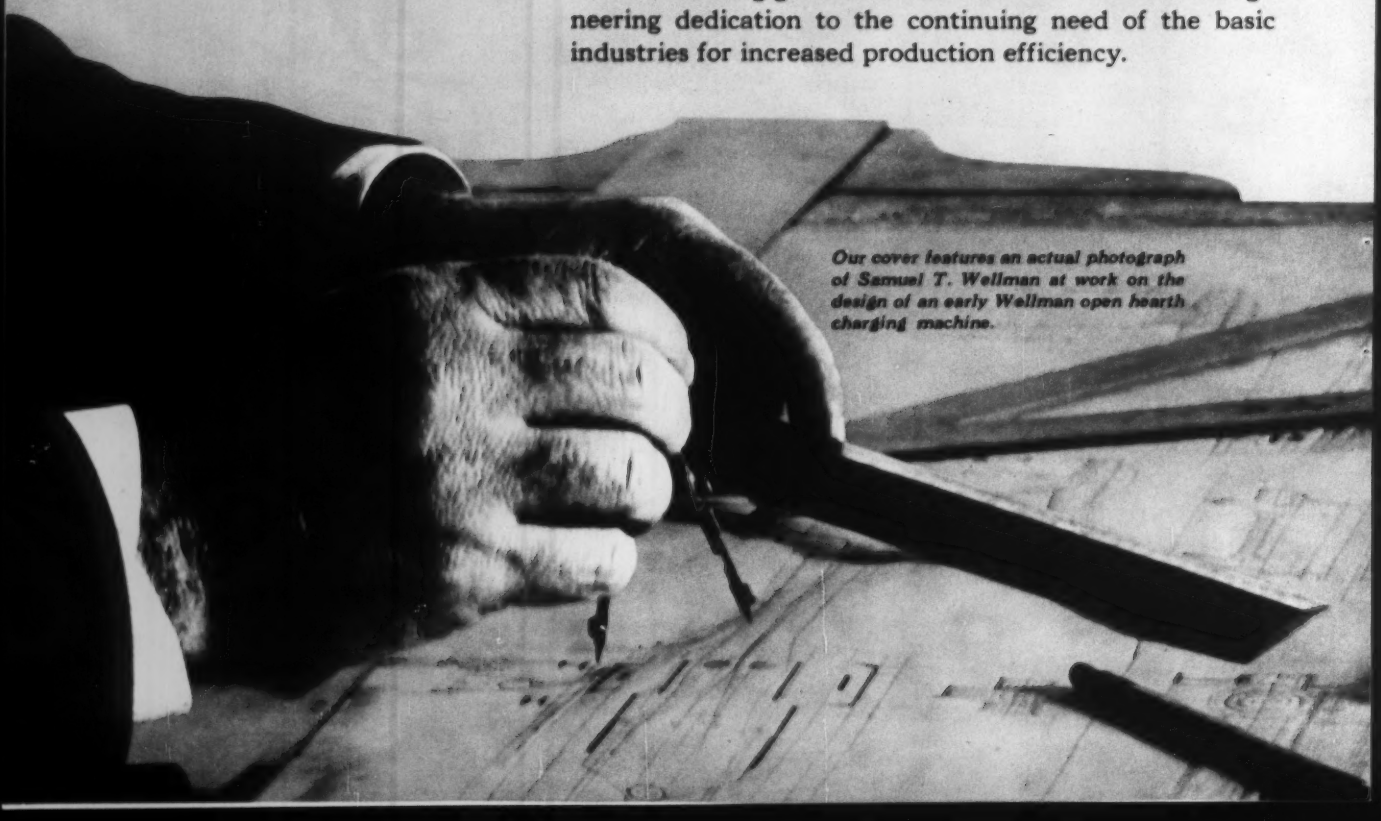
The Wellman Engineering Company celebrates

1896 **60** 1956

YEARS OF SERVICE

Serving the stalwarts of America's great industrial community throughout the years of our mutual growth, Wellman creative engineering is identified with the development of unique mechanical entities which live, which perform the functions of many hands.

Building upon the pioneering work of its founder, Samuel T. Wellman, "father of the open hearth process of steelmaking in the United States", Wellman equipment for each succeeding generation has shown characteristic engineering dedication to the continuing need of the basic industries for increased production efficiency.



Our cover features an actual photograph of Samuel T. Wellman at work on the design of an early Wellman open hearth charging machine.

in Steel-Making Machinery

Wellman builds a complete range of coke plant equipment, including coal charging cars, coke guides, coke oven doors, combination coke pusher, coal leveler and door extractor machines, coke side door extractors, and coke quenching cars.

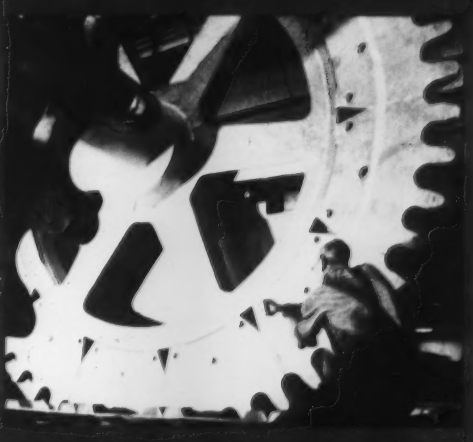
TO BASIC INDUSTRY

in Bulk Materials Handling Systems

World's largest belt conveyor iron ore stocking bridge classifies Venezuelan ores.

in Special Fabrications

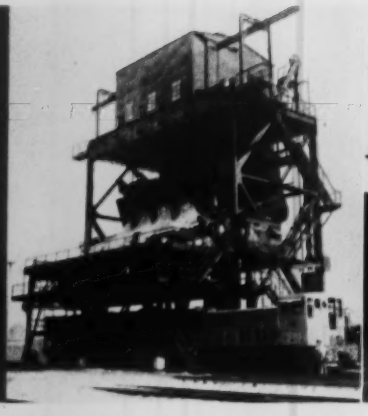
Skilled craftsmen working with precision tools and equipment in the Wellman shop fabricate machinery of every size and complexity.



Pioneering still, Wellman engineering for the age of automation expresses an intimate understanding of the demand of today's heavy industry: mechanical equipment, more nearly human than ever, created from contemporary concepts of plants and processes, thus making Wellman's contribution to the American ideal of producing more goods for more people with greater economy.

In 1954, Wellman joined the family of related enterprises of McDowell Company, Inc., engineers and contractors serving the basic industries. Through this purposeful alliance, Wellman engineering and fabricating facilities are broadening the scope of the McDowell Method, which is at work on the new frontiers of turnkey planning . . . rooted in economics as well as engineering . . . and embracing design, construction and complete mechanical installation of going plants, delivered in operation.

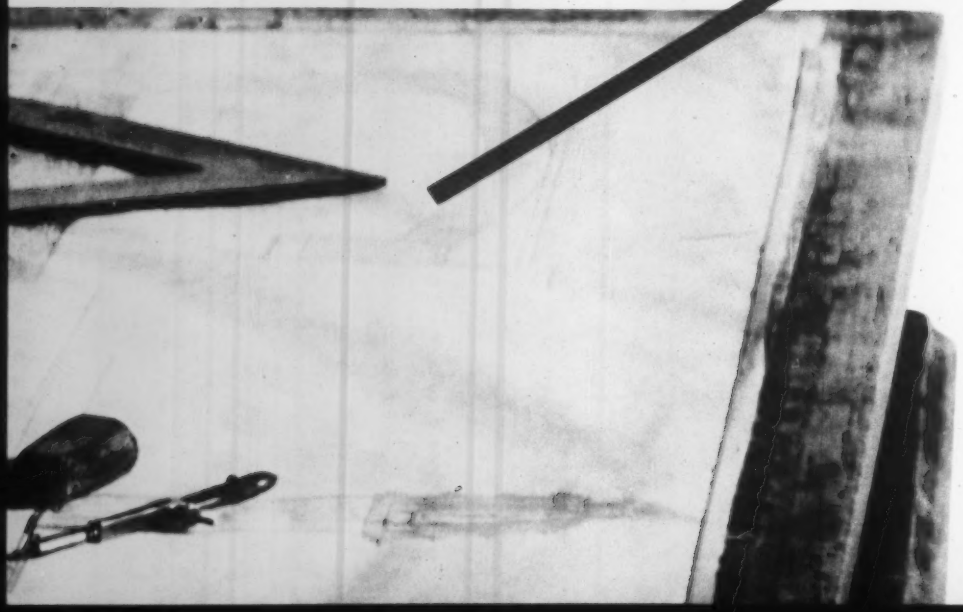
TO BASIC INDUSTRY . . . . . .

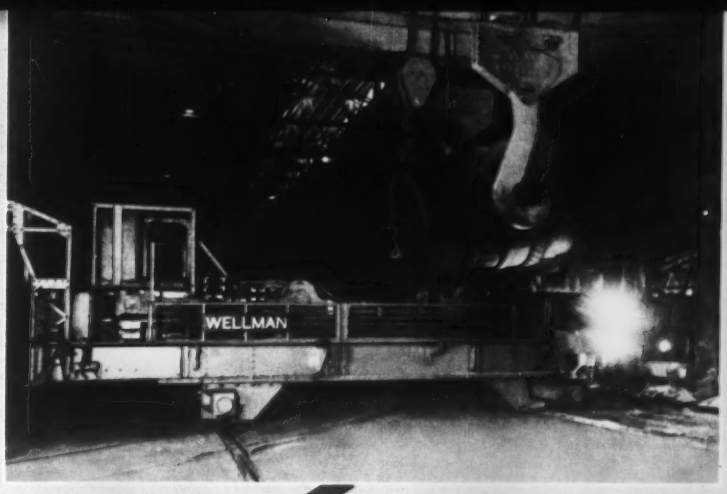


Wellman 90-ton turn-over cardumper, with motor operated gates, at a mid-western steel plant.

At a Canadian trans-shipping station, two Wellman 12-ton towers unload iron ore from Labrador.

Biggest Huletts ever built, these 20-ton machines operate on tracks curved to a 65 degree arc at a Lorain, Ohio, dock.

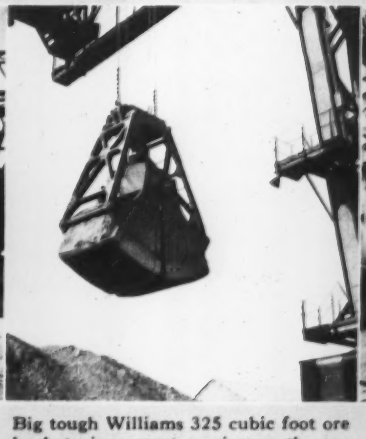




Wellman charging machines remain the first choice of open hearth operators today, 68 years after Samuel T. Wellman created the first of them.

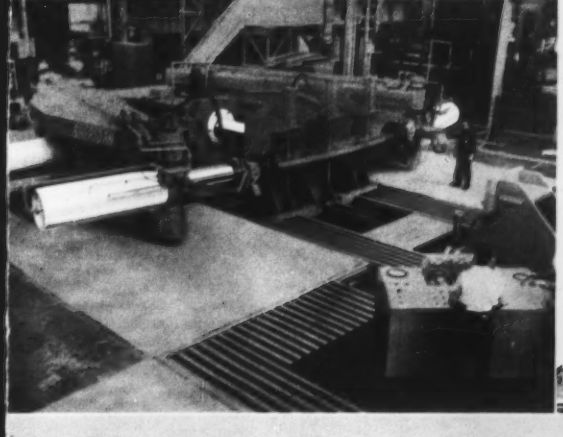
from mine...to mill...through finished product

Wellman pulpwood handling plant solves storage problem for southern U. S. paper producer. Bridge pivots on pier to negotiate circle, is equipped with 1¼-cord Williams grapple.

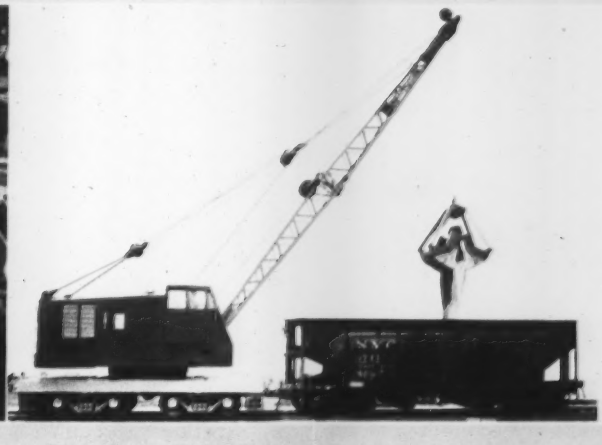


Big tough Williams 325 cubic foot ore bucket gives great service on the ore dock of a Cleveland steel mill. Wellman offers a complete line of Williams industrial buckets.

Wellman fabricates McDowell Company's Flying Saucer, newest development in fines agglomerating, and Dwight-Lloyd sintering equipment.



Anker-Holth air and hydraulic cylinders, engineered in standard and special designs, are swiftly replacing mechanical power motions in modern industry.



The all-new Wellman diesel electric locomotive crane features ball race rotation, speeds to 15 miles an hour, capacities from 25 to 80 tons.

at Wellman everything begins *here*

Wellman traveling shiploader handles 6,000 tons of iron ore per hour in Venezuela.

1896 **60** 1956

YEARS OF SERVICE TO BASIC INDUSTRY

Wellman's cultivated place in the field of development engineering is the endowment of its illustrious founder, Samuel T. Wellman, who brought the open hearth process of steelmaking to America.

Sam Wellman may not have known the word, but the prolific issue of his drafting board is alive with automation — a genesis manifested then as now by talented mechanical entities that live and do a job.

Today the Wellman heritage is expressed by its inquisitive engineering mentalities, exploring the manifold challenges of the basic industries — in bulk materials handling, heavy hoisting, steelmaking, gas producing, etc., all dedicated to greater production efficiency.

THE WELLMAN ENGINEERING COMPANY

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THE McDOWELL FAMILY OF RELATED ENTERPRISES

McDowell Turnkey Plants • Dwight-Lloyd Research Laboratory • Wellman Bulk Materials Handling Systems and Steelmaking Machinery • Anker-Holth Power Cylinders • Dwight-Lloyd Ore Beneficiating Plants • ABCs Belt Conveyor Scales • Williams Buckets • Wellman Locomotive Cranes

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—for Dependable Springs—
Nowhere is there a better example of Washburn care and precision than in Eagle MUSIC WIRE. Our own basic steel—close tolerances and care in handling, all make for superlative quality.
WASHBURN WIRE CO., New York City

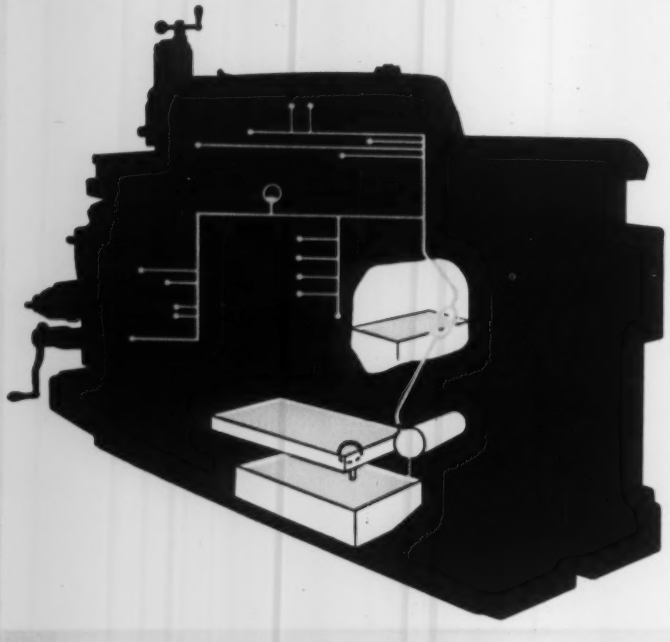
50 lbs. oil pressure

IS NECESSARY WITH A CUT LIKE THIS...

Demonstration cut on Cincinnati Rigid Shaper.
Actual size steel chip, 2" cut, .030" feed.

This tremendous cut demonstrates the ability of the 50 p.s.i. lubrication system to develop and maintain oil films under the heaviest loads.

It also demonstrates the strength, rigidity and power which are standard features on all Cincinnati Rigid Shapers.



Write for Bulletin "Cincinnati Rigid Shapers"

50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.

The Electro-Magnetic Brake and Clutch with finger tip control are standard features on Cincinnati Shapers for maximum speed and ease of operation. ☆

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CINCINNATI

"And I say it has to be an ALDRICH PUMP!"

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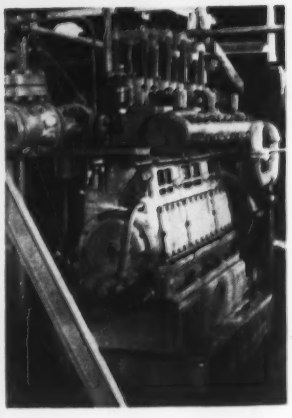
The very simplicity of the Aldrich Direct Flow design means horizontal straight line flow from suction to discharge. Reduced space between valves results in higher volumetric efficiency. Fluid-end sectionalization for fast, easy maintenance; changeable plunger sizes; and interchangeability of parts are additional reasons why Aldrich Pumps have earned a reputation for dependable, low cost performance on applications such as die casting, hydraulic press operation, roll balancing, descaling and hydraulic testing.

For your tough pumping problems, it pays to specify Aldrich. Write today for a copy of Data Sheet 100, a condensed catalog and selection chart covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.



Four 5" stroke Aldrich Direct Flow Pumps on die casting service in a midwestern metalworking plant. These pumps are handling 250 gpm at 1500 psi.

THE ALDRICH PUMP COMPANY

GET A BETTER RECOVERY

...of manganese with MANTEMP ferromanganese

This new exothermic manganese alloy allows open hearth melters to make higher additions of manganese to the ladle (up to 1.5% manganese). Thus you get:

- 10% to 15% higher recoveries of manganese.
- More consistent manganese recoveries with fewer missed heats.
- 15 to 20 minutes less furnace time for low-carbon heats.

The strong exothermic action of MANTEMP ferromanganese sharply reduces segregation of manganese within the ladle. In addition, its unique exothermic reaction allows higher and more consistent recoveries of aluminum when aluminum is added as an alloying element.

Your nearest ELECTROMET office will be glad to give you further information concerning the high and medium-carbon grades of MANTEMP exothermic ferromanganese.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N. Y.

Offices in 10 major cities
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited

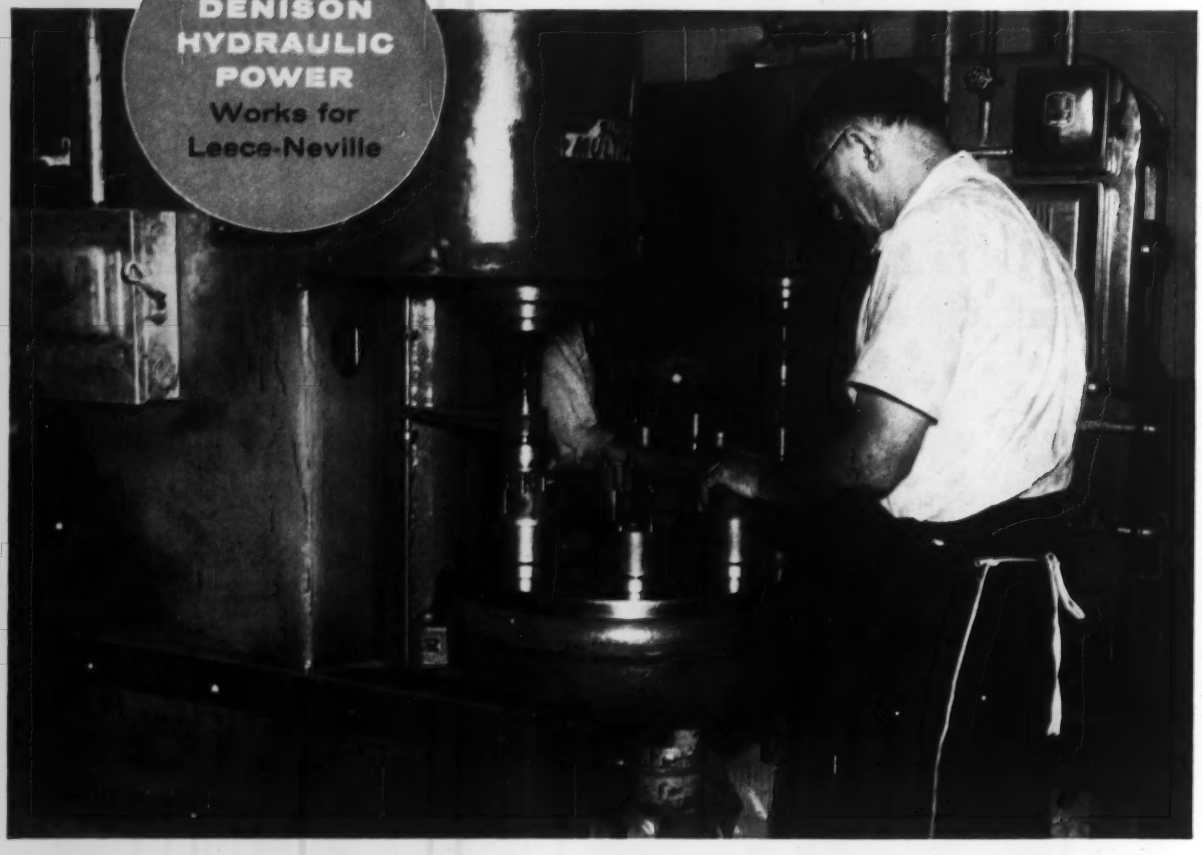
METALS DO MORE ALL THE TIME ... THANKS TO ALLOYS

Electromet

The terms "Electromet" and "Mantemp" are trade-marks of Union Carbide.

How DENISON HYDRAULIC POWER Works for Leece-Neville

Six-station index table on 8-ton hydraulic Multipress enables operators to stake rivets on 11,000 lamination stacks in 8-hour period.



MULTIPRESS® simplifies small motor production

4,560 brush riggings are assembled every 8 hours in this Multipress operation which eliminates bottlenecks at strategic points in the production process.

At the Leece-Neville Company, Cleveland, Ohio, fractional horsepower motors are produced around-the-clock. With the help of Denison hydraulic Multipress, automated methods have been incorporated to speed and simplify production.

An example is the use of two 8-ton presses for staking rivets on lamination stacks. In other applications, Multipress assembles brush riggings and armature cores, and notches motor housings. In all of these operations, precision control *plus* savings in time, lost motion and scrap make the investment in Multipress highly profitable.

Denison engineers are specialists at helping *your* company improve product quality. Write Denison Engineering Division, American Brake Shoe Co., 1180 Dublin Road, Columbus 16, Ohio.

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

CALENDAR
OF MEETINGS

Dec. 10-11, Material Handling Institute Inc.: Annual meeting, Biltmore hotel, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

1957

Jan. 12, American Electroplaters Society: Winter meeting, Sheraton Penn hotel, Pittsburgh. Society's address: 445 Broad St., Newark 2, N. J. Secretary: John P. Nichols.

Jan. 13-16, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc and Fontainebleau hotels, Miami Beach, Fla. Institute's address: 1729 H St. N.W., Washington 6, D.C. Executive vice president: E. C. Barringer.

Jan. 14-18, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 16-18, American Management Association: International management conference, Roosevelt hotel, New York. Association's address: 1515 Broadway, New York 36, N.Y. Secretary: Andrew P. Donovan.

Jan. 16-17, Caster & Floor Truck Manufacturers Association: Winter meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: H. P. Dolan.

Jan. 17-18, Steel Plate Fabricators Association: Annual meeting, Palmer House hotel, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 18, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

Jan. 19-23, Truck-Trailer Manufacturers Association: Annual meeting, Del Coronado hotel, Coronado, Calif. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N.Y. Secretary: N. S. Hibshman.

Jan. 21-22, Solar Furnace Symposium: Westward Ho hotel, Phoenix, Ariz. Sponsor: Association for Applied Solar Energy, 3424 N. Central Ave., Phoenix, Ariz. Secretary: John I. Yellott.

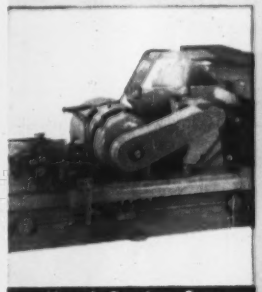
Jan. 23-24, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 24-26, National Tool & Die Manufacturers Association: Winter meeting, Biltmore hotel, Palm Beach, Fla. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Jan. 28-31, Associated Equipment Distributors: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Hermann.

Norgren SPRAY-LUBE
INCREASES PRODUCTION from MACHINE TOOLS

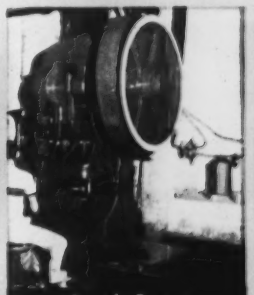
- Increases Tool Life
- Improves Quality of Work
- Reduces Maintenance Costs



Metal Cutting Saw

CUTS FASTER . . . DOESN'T OVERHEAT

Oliver Sawing Machine cuts 4" to 6" slabs of non-ferrous metals. By changing to SPRAY-LUBE: (1) Fusion of chips to saw teeth ended. (2) No galling—surfaces now resemble machined finish. (3) Saw feed faster—cuts 6" aluminum slabs at 5 fpm.



Punch Press

OUTPUT INCREASED 15% DIE LIFE INCREASED 100%

Formerly lubricated by hand swabbing every 6 cycles of press, splashing on machine, floor and operator. Now, SPRAY-LUBE automatically lubricates die and blank every cycle, increasing die life 100%, and output 15%. Lubricant cost cut in half.

Tapping Machine

30% MORE OUTPUT

SPRAY-LUBE replaced flood system on tapping machine at the Square D Company, eliminating excess of lubricant and ending time lost for cleaning parts. Splashing lubricant on operator and floor also ended. Production increased 30%.

Gear Hobbers

$250 A YEAR LUBRICANT SAVING PER MACHINE

Cullman Wheel Co. replaced splash coolant systems on gear hobbers with SPRAY-LUBE. Results: (1) Tool life increased. (2) Tool grinding time reduced. (3) Working conditions cleaner, safer. (4) $250 a year per machine saved in lubricant costs.

Turret Lathe

OUTPUT DOUBLED

SPRAY-LUBE on lathe at O.K. Rubber, Inc. has: (1) Increased surface cutting speed from 45 to 75 rpm, nearly doubling output of machine. (2) Ended welding of chips to tool. (3) Increased depth of cut. (4) Improved quality of work.

Chain Drive

OVER TWO TIMES LONGER CHAIN LIFE

At Wagner Electric in St. Louis, SPRAY-LUBE automatically lubricates chain drive on degreasing machine. Chain now runs smoothly and quietly. Lubricant, removed by the hot cleaning solution, is now constantly replaced, doubling chain life.

For complete information about Norgren SPRAY-LUBE, call your nearby Norgren Representative listed in your telephone directory—or WRITE THE FACTORY for Bulletin 537

C.A. Norgren CO.

C. A. NORGREN CO 3412 So. Elati St., Englewood, Colorado

You Get Practical Help on Vapor Degreasing of Metals

Your Du Pont technical man and your distributor for "Triclene" D trichlorethylene are but a phone call away when you need fast, practical help in vapor degreasing.

The broad experience of the Du Pont Technical Representative and the skill and facilities of Du Pont research and laboratories assure you of the finest in technical help. The Du Pont technical man's job is to help you keep your vapor degreasing at top efficiency—whether a complete analysis of your operation is required, or a quick solution to an immediate problem.

Call him direct, or ask your distributor of "Triclene" D for his services. They're yours for the asking. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

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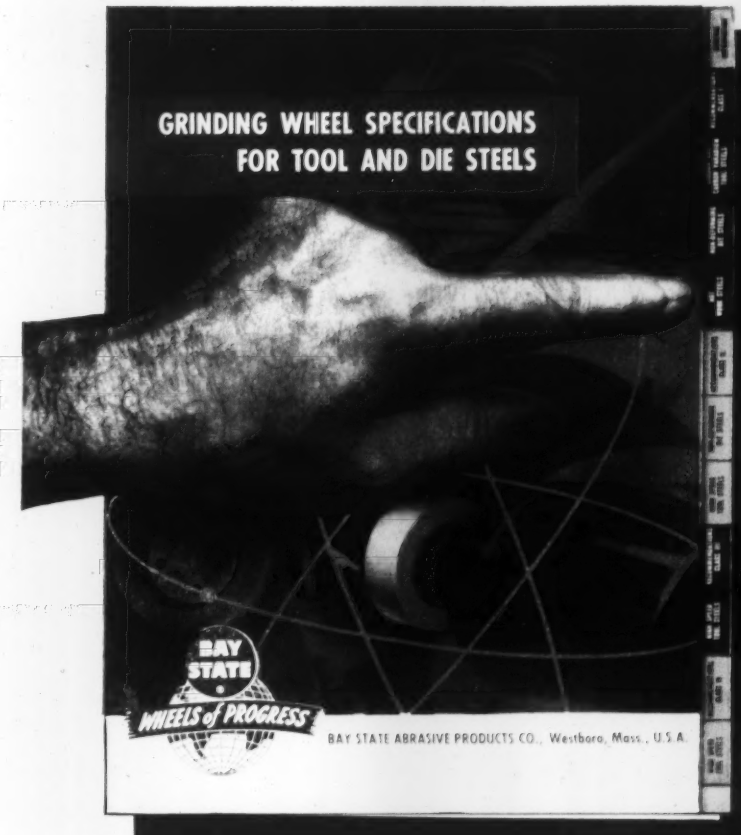
GRINDING WHEEL SPECIFICATIONS
FOR TOOL AND DIE STEELS
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WHEELS of PROGRESS
BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass., U.S.A.

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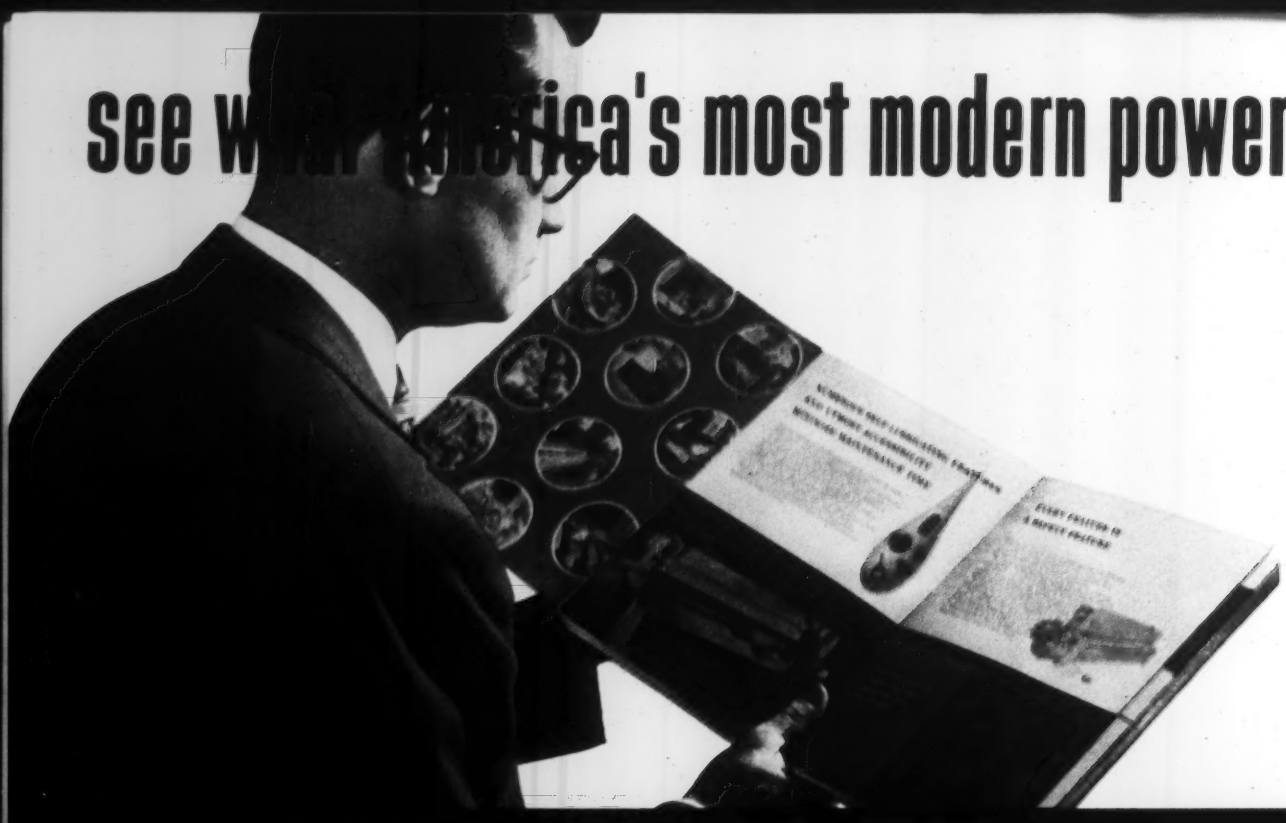
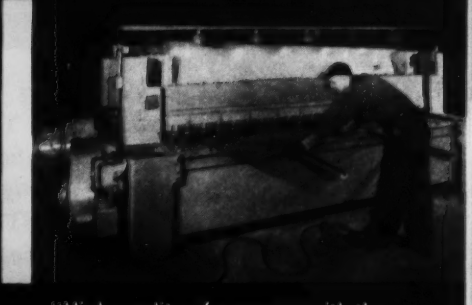


SHEAR USERS EVERYWHERE TELL THEIR STORIES OF NIAGARA BENEFITS

(3 of 19 Photo-Reports shown in Niagara's new Bulletin 69G)

an exceptional machine value"
— World's Largest Trailer Mfr.

"For over 10 years we have never had any downtime for repairs and maintenance."
— V-Belt Pulley and Caster Mfr.



"High quality of accuracy with the utmost in speed and performance"
— Midwest Road Machinery Mfr.

squaring shears can do for you!

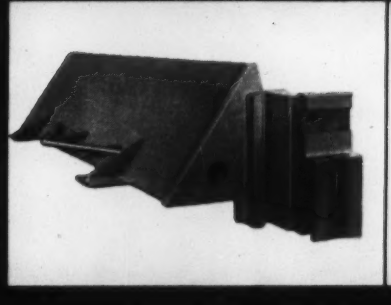
Speed that spells peak productivity! Accuracy for cutting within micrometer tolerances! Ruggedness to stand the gaff on stiffest assignments! They're all yours with a Niagara Power Squaring Shear. New, fact-filled 74-page Bulletin is profusely illustrated to show you how and why:

From mass producers, fabricating plants, steel warehouses and sheet metal shops comes written evidence of the superiority of Niagara Underdrive Squaring Shears on jobs of every description. *No other shear can match Niagara's record for cutting accuracy, speed and downright economy of operation.*

For a photo story of the many tangible ways in which a Niagara Power Squaring Shear can boost hourly output, improve quality and slice maintenance costs in your plant, make sure that you receive Niagara's newly-published Bulletin 69G by mailing the coupon below. Presenting the greatest shear story ever told this 74-page document will give you a close look at Niagara Shears in numerous applications . . . the *closest* look you have ever had at *any* shear, next to having it on your own floor! It will show you feature-by-feature why a Niagara Shear is far ahead at every point of comparison . . . and why it pays to look to America's oldest leading shear manufacturer for the most profitable answers to *your* requirements.

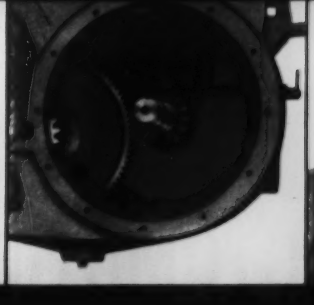
NIAGARA-DEVELOPED FEATURES PROVIDE THE ULTIMATE IN MODERN SHEAR PERFORMANCE

(Here's a glimpse at just a few of many. See them ALL in new Niagara Bulletin 69G)



Fully Closed Box Type Construction

Massive Bed Designed for Super Strength



Instantly Engaging Multi-Jaw Clutch

Powerful, Self-Compensating Holddown

YOURS FOR THE ASKING...

the most comprehensive shear bulletin ever published!

Months in preparation, this fact-filled bulletin now gives you valid, inside facts on the nation's top line of power squaring shears. 74 pages! 141 revealing photographs and illustrations! Specifications for nearly five dozen standard models! Capacities: 16-gage to 1" mild steel. Cutting lengths: 4 to 20 ft. Make sure that you receive a copy at once. Mail the attached coupon today.

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MAIL your new Underdrive Squaring Shear Bulletin 69G to us immediately.

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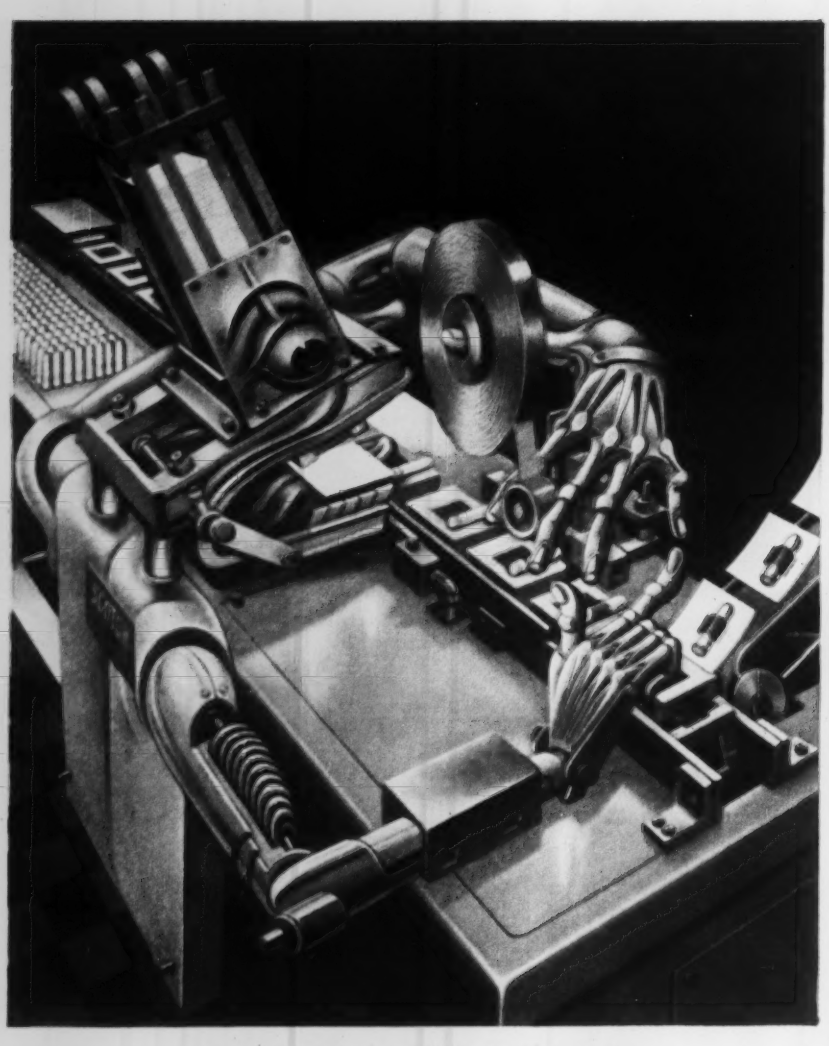

AUTOMATION? you name it...we'll tape it!

Whether your packaging problem is as light as affixing lipsticks to resale display cards . . . or as heavy as bundling heavy-wall pipe . . . or as utilitarian as sealing and reinforcing a carton . . . or just about any sealing, labeling, holding, binding, or banding job in between . . . you can probably get an automatic or semi-automatic machine to do the job better, faster, and cheaper using "SCOTCH" Brand Pressure-Sensitive Tapes. Your regular tape distributor will be glad to discuss your particular needs without cost or obligation. Or, write us for the booklet described at right.

PRODUCT OF 3M RESEARCH

DISPENSERS *for the more than 300 pressure-sensitive tapes for industry, trademarked . . .*

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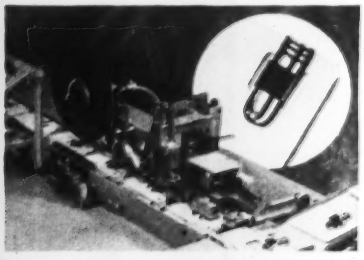
SCOTCH BRAND

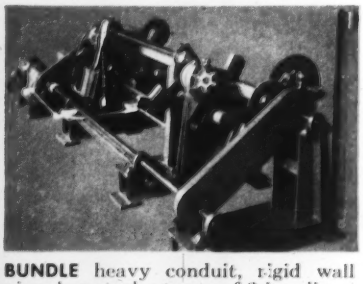
The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

3M

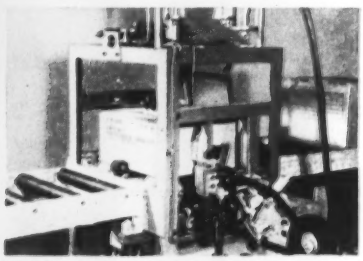
Look what you can do with dispensers!



TAPE small items to display cards with a "SCOTCH" Brand Tape Stapler, (dramatized by Artzybasheff at left). Operates at speeds up to 80 units a minute; handles a variety of "SCOTCH" Brand Tapes.

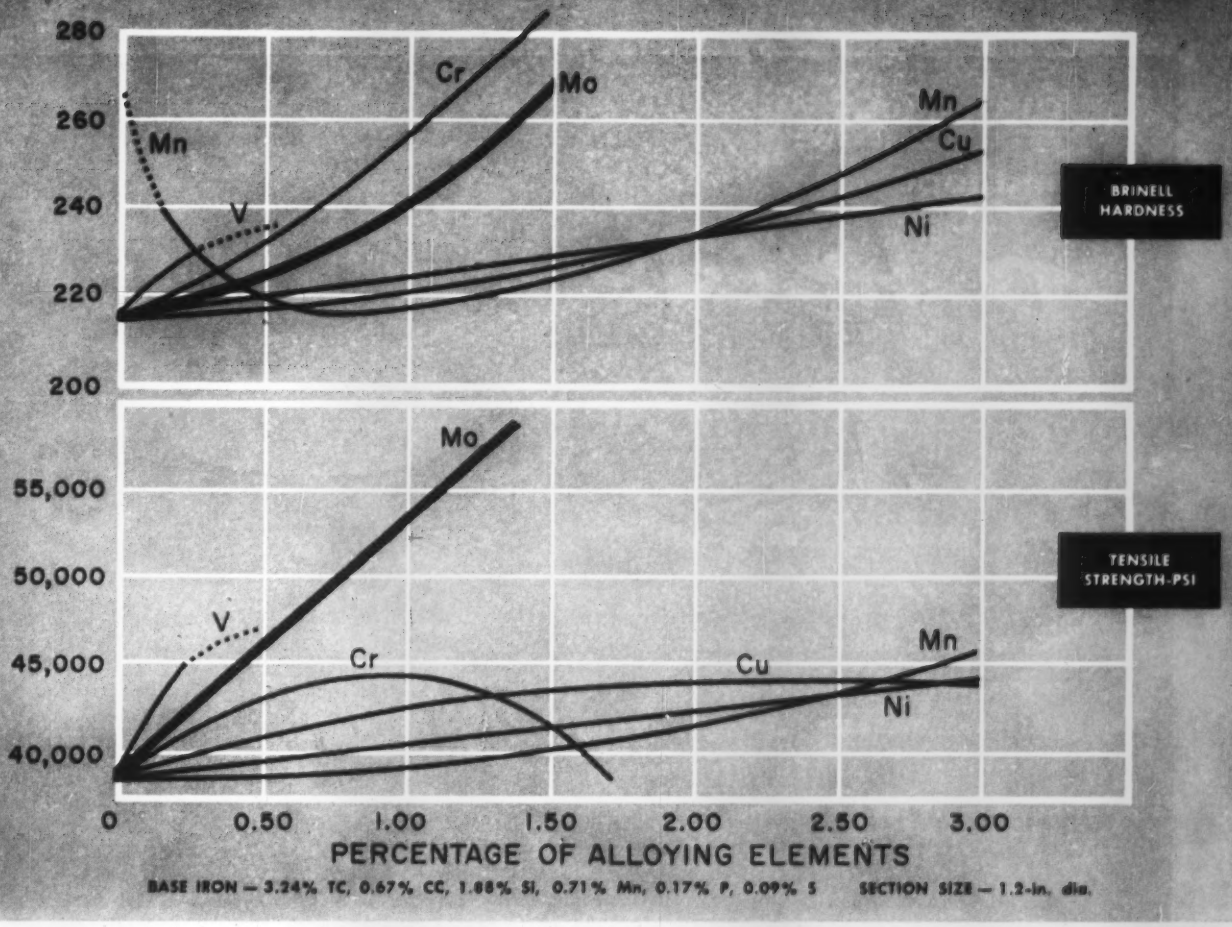


BUNDLE heavy conduit, rigid wall pipe, bar stock at rate of 3 bundles a minute. Machine automatically wraps "SCOTCH" Brand Filament Tape—the world's strongest tape—around both ends of bundle.



CLOSE and reinforce full telescope cartons with "L" shaped clips of "SCOTCH" Brand Filament Tape. Automatic Box Taper handles up to 10 cartons a minute . . . can be integrated into conveyor line.

SEND FOR illustrated manual describing "SCOTCH" Brand Dispensers and Applicators for nearly every taping need. Just write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. GK-126.



Note how additions of moly, up to 1.5%, produce proportional improvements in strength. And, with moly, hardness increases much more slowly. It means higher strengths can be used with less danger of impaired machinability.

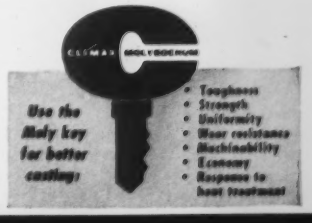
each ½% Moly adds 7000 psi to strength of cast iron...

A little moly adds a lot of strength — for molybdenum increases strength more than any other common alloying element, with the exception of small vanadium additions. A rule of thumb is that fifty points of moly raise tensile strength 7000 psi. And without sacrificing toughness. Actually, moly improves toughness at least as much as strength.

What's more, versatile moly aids in obtaining uniform response to heat treatment . . . and in producing machinable, growth-resistant castings. Moly is easy to use, too. With most grades of cast iron, moly requires no change in the character of the charge, normal melting practice, or the base metal. And foundrymen like the fact that the small additions necessary may be made at the spout or in the ladle.

Write now for "Why Moly Iron". It's the full story of how and why moly adds strength faster than hardness, how it increases fatigue and torsional strength—in short why moly makes better cast iron. Climax Molybdenum Co., Dept. 3, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM



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Behr-cat Tapes

are serving everywhere!

Wherever you look, you'll see modern, cost-cutting Behr-cat® Tapes providing better, faster operations for masking, sealing, holding, reinforcing, strapping or identification. Put them to the test in your plant today.

✳ Write for the Behr-cat Tape Brochure—contains illustrations and specifications on each tape. Address Behr-Manning, Troy, New York.

T-6

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes
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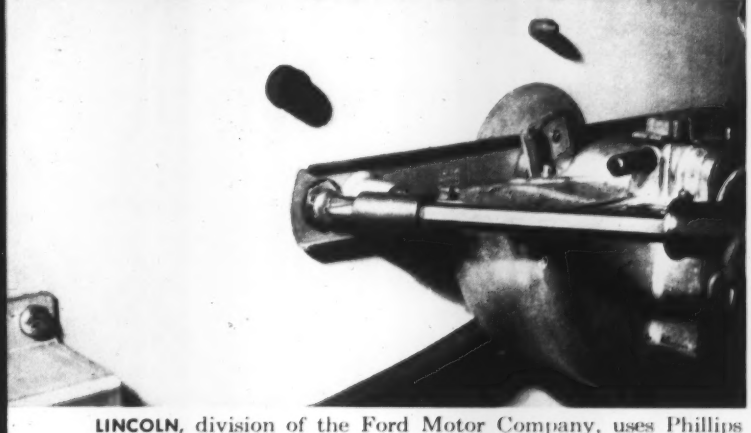
NORTON ABRASIVES

Greater Production - Neater Installation with PHILLIPS CROSS RECESSED HEAD SCREWS

"OUR PRODUCTION INCREASED 50%, and probably even more since the use of power drivers made possible by Phillips head screws," says the Plant Manager of Yankee Metal Products Corporation of Norwalk, Connecticut. Phillips screws have also eliminated damage and have facilitated the ready replacement of signal lenses.

"PHILLIPS SCREWS HAVE REWARDED US with increased production, ease of operation, elimination of damage due to screw driver slippage, longer tool life, more attractive appearance, more positive gripping and more secure fastening," states Mr. Solar, plant manager of Fleet of America, Inc., makers of quality aluminum prime windows and doors.



LINCOLN, division of the Ford Motor Company, uses Phillips Cross-Recessed-Head Screws in the construction of the luxurious Lincoln automobile. The picture above shows Phillips screws being easily installed in the windshield wiper motor of the Lincoln.

MANUFACTURERS OF PHILLIPS CROSS-RECESSED-HEAD SCREWS

THE FASTENERS OF TODAY...
AND OF THE FUTURE
X marks the spot
the mark of extra quality

Pledged to highest standards...

The Phillips Screw manufacturers listed here cooperate to turn out a uniformly high standard of quality. As sponsors of the Phillips Cross-Recessed-Head Standards Committee they adhere to the established dimensional standards, gauges, and gauging methods which will best serve industry.

Members of Screw Research Association

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation Pheoll Manufacturing Co. • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company • Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

Cold-formed parts by the million—

yet dies stay like new!

The secret:

FOS lubrication by Pennsalt

The way to fast, efficient cold forming—with minimum rejects, long die life, and cost savings as high as 50%—is through the thorough lubrication provided by Pennsalt's FOS Process. Specialized FOS lubricant systems assure the vital separation of cold-forming wire from the dies, preventing welding and galling . . . boosting press production . . . saving tools and materials.

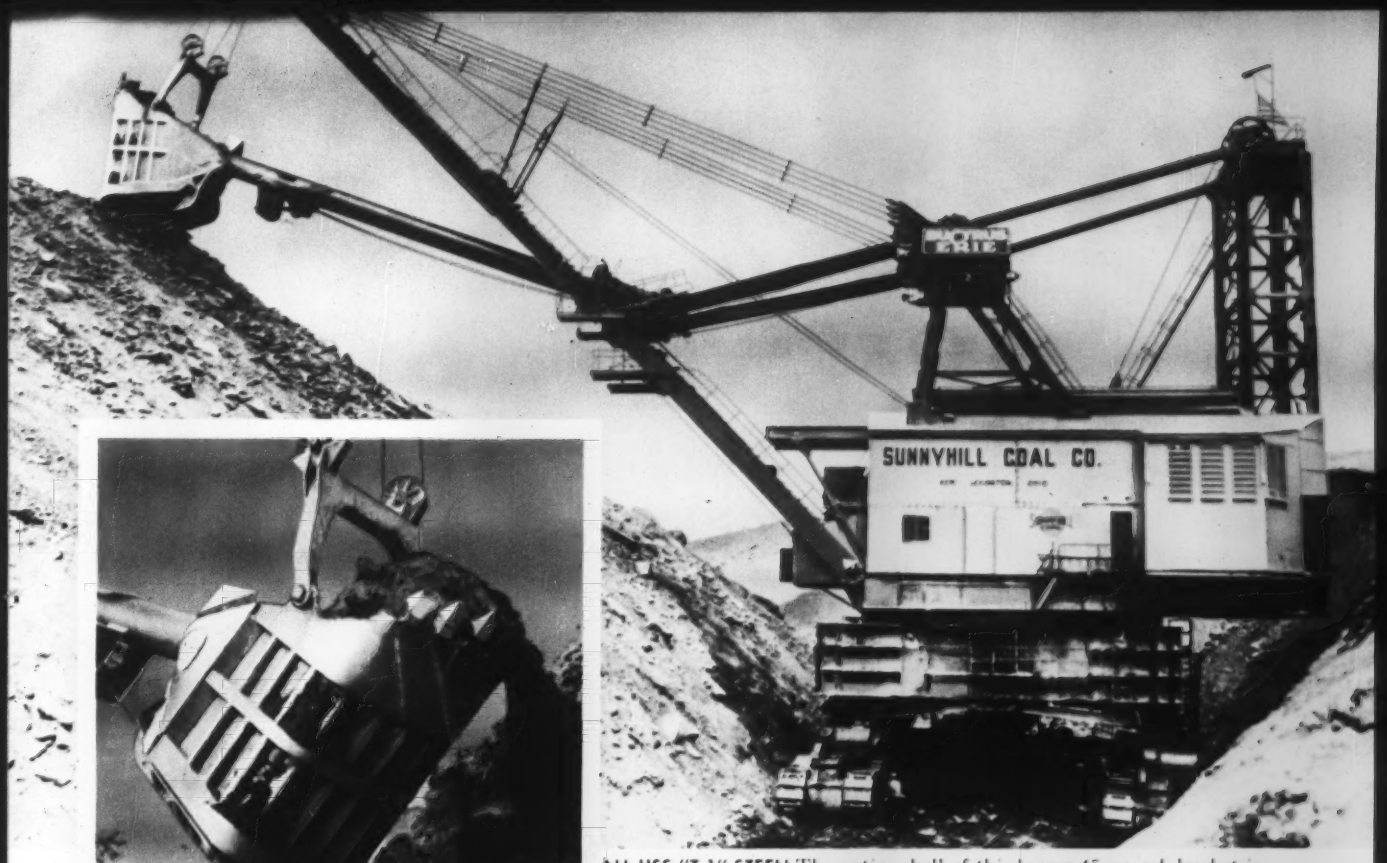
WHAT'S THE FOS PROCESS? A method offering the most comprehensive selection of phosphate coatings and organic lubricants ever designed for cold-working applications. Pennsalt FOSCOAT®, DRAWCOTE®, and FOSLUBE® products have been developed for every forming operation from severe deep drawing and extrusion to simple cold heading.

CALL ON PENNSALT'S EXPERIENCE in metalworking chemistry for advice on your cold-forming lubricant needs. Hear what your Pennsalt service man has to say about FOS, or write Metal Processing Department 313, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: 2020 Milvia Street., Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

Pennsalt Chemicals

Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants

A BETTER START FOR YOUR FINISH



ALL USS "T-1" STEEL! The entire shell of this larger 45-cu. yd. bucket is fabricated from ½-inch USS "T-1" Steel plate. Liner plates are made from ⅜-inch "T-1" Steel with a minimum Brinell hardness of 321. Dipper lip, now made from 6½-inch USS "T-1" Steel plate, formerly was nearly a foot thick. Dipper door and hail also are USS "T-1" Steel. Durability and resistance to impact abrasion are excellent.

USS "T-1" STEEL PLATE . . . replaces castings . . . saves weight . . . boosts shovel capacity 25%

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin, wanted to boost the productive capacity of its Model 1050-B stripping shovel. But they didn't want to redesign the entire machine. Instead, they redesigned just the dipper . . . increased its capacity from 36 cubic yards to 45. Lighter-weight construction with USS "T-1" Steel made it possible.

The high yield strength and resistance to impact abrasion of USS "T-1" Steel enabled Bucyrus-Erie to replace large, heavy castings with plate that is little more than half as thick. The thinner-sectioned "T-1" Steel not only saves weight but makes possible a thinner, curved dipper lip that bites into overburden more easily than the previous design.

Bucyrus-Erie has taken advantage of USS "T-1" Steel to accomplish the same sort of improvement on other shovels. They have increased capacities from 28 to 33 cu. yds. . . . from 26 to 32 cu. yds. . . . from 20 to 24 cu. yds. In every case, they have done it without sacrificing performance or durability.

Look into the economy of USS "T-1" Steel in original equipment or for repair of existing machines. Remember, it has phenomenal sub-zero toughness, excellent high temperature strength, good resistance to impact abrasion, as well as unusually high yield strength of 90,000 psi. And it is easily weldable—without pre- or post-heating.

Write, wire, or phone any United States Steel Office for additional information.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS

UNITED STATES STEEL

SKF uses USS Quality Steel

FOR about nine years, SKF Industries, Inc. has been making the "SKF Multi-Row Cylindrical Roll Neck Bearing." According to SKF, the design provides the greatest load-carrying capacity that can be attained in a given space, yet the bearing is completely separable for inspection and maintenance.

Recently, SKF completed the largest bearings of this particular design ever made—each 46½" OD and weighing 7,000 pounds! The rings for these bearings were forged from a premium-quality USS Steel.

After the bearings are ground and honed, there can be no surface imperfections that might cause stress concentration. Internally, the steel has to be sound enough to carry tremendous loads and pressures. These bearings have a mill rating of nearly eight million pounds —reason enough for using USS quality steel for the all-important rings!

USS uses a specially prepared electric furnace for melting this kind of steel. Every precaution is taken to assure the utmost in cleanliness, and great care is exercised in the slag composition and in the introduction of alloying additives. Tapping and pouring temperatures are held to narrow limits, and the ends of the ingot are cropped so that only the best steel can be used for forging.

We would appreciate your inquiries for USS Quality Forgings or rolled alloy bars and semi-finished stock for any size bearings. Address inquiries or requests for our 32-page booklet on USS Quality Forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

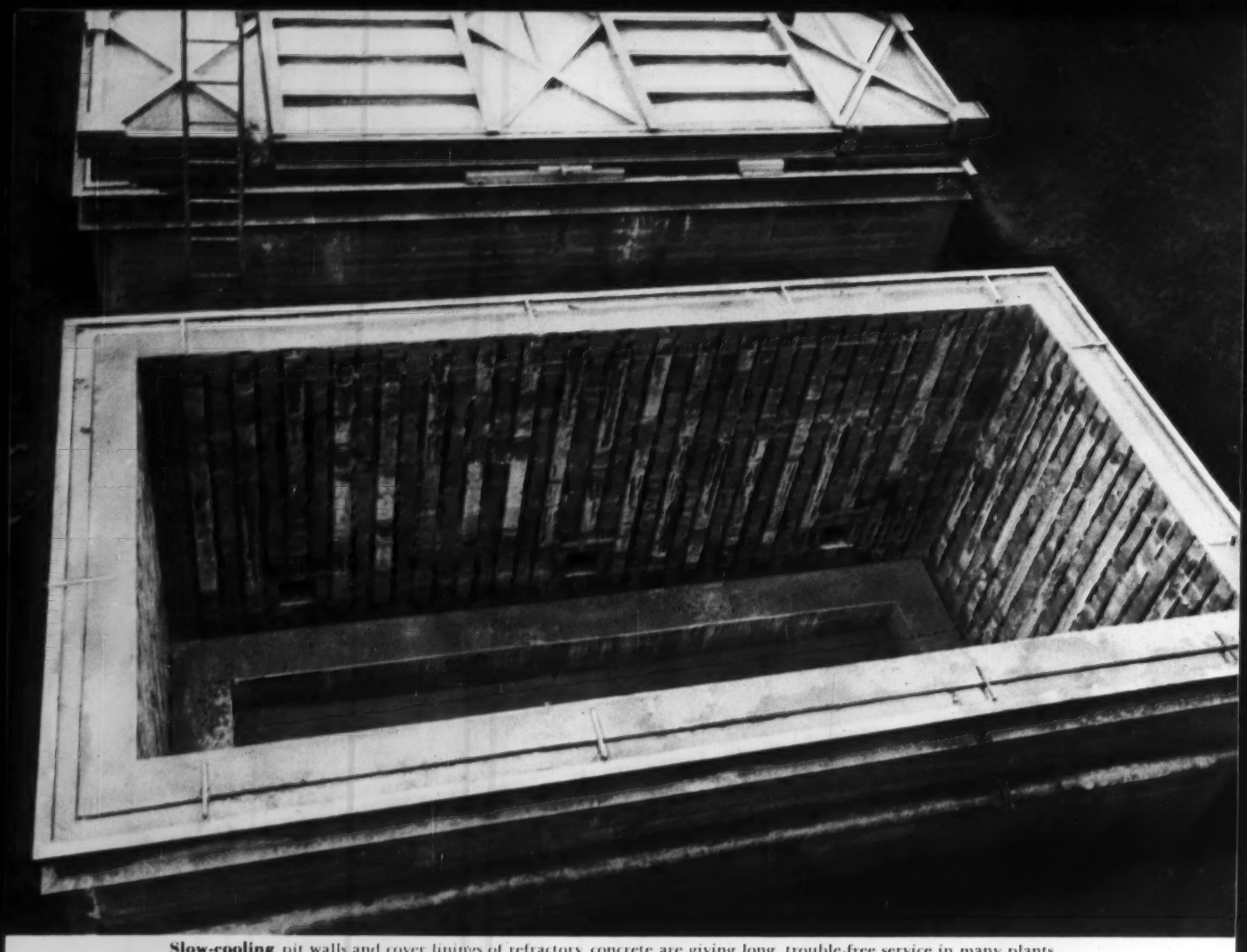
USS

UNITED STATES STEEL

80-ton electric furnace in which the bearing steel was melted.

Bearing has four rows of cage-retained rollers. Dimensions are 46½" OD, 33" bore and 33½" width. It weighs 7,000 lbs.

for 3½-Ton Bearings



Slow-cooling pit walls and cover linings of refractory concrete are giving long, trouble-free service in many plants.

Refractory-concrete cooling pits last longer...cost less!

Where maximum resistance to both physical and thermal shock must be achieved, refractory concrete is ideal, because it gives increased durability while reducing repairs and downtime to a minimum. And refractory concrete made with Lumnite* calcium-aluminate cement is easy to place — using the plant labor force — and *stays* in place under tough service conditions. For maximum convenience in placing, you can use Lumnite-base castables. Because these castables are premixed and ready to use, they give more uniform performance, and are especially handy in emergencies. Lumnite-base castables are made and distributed by leading manufacturers of refractories. For more information, write:

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee
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*"LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-137

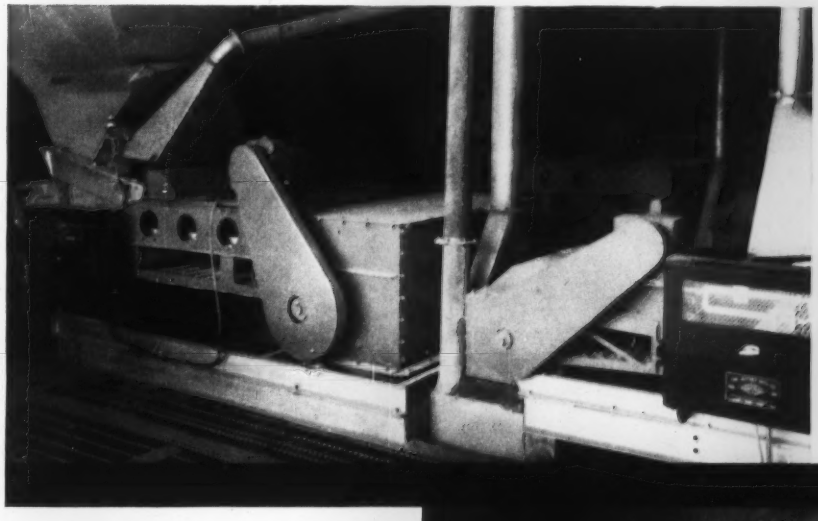
Atlas® Lumnite Cement

FOR INDUSTRIAL CONCRETES

REFRACTORY • INSULATING • OVERNIGHT • CORROSION-RESISTANT

United States Steel Hour — Televised on alternate Wednesdays — See your local newspaper for time and station

WAYTROLS® feed an inferno with ± 1% accuracy



A metal producer reports ± 1% accuracy in proportioning with a pair of Jeffrey WAYTROLS.

Close formulation of the mixture as provided by WAYTROLS is vital to quality production in an electric furnace.

Mix an ore with slagging and reducing agents in the proper proportions. Apply the 3100° heat of an electric arc under carefully controlled conditions. Draw off the molten metal. Basically, that's the electrothermic process so widely employed today.

"Proper proportions" is the keynote to success. Inaccurate proportioning may ruin the entire process. Jeffrey WAYTROLS (continuous weigh feeders) help avoid that hazard.

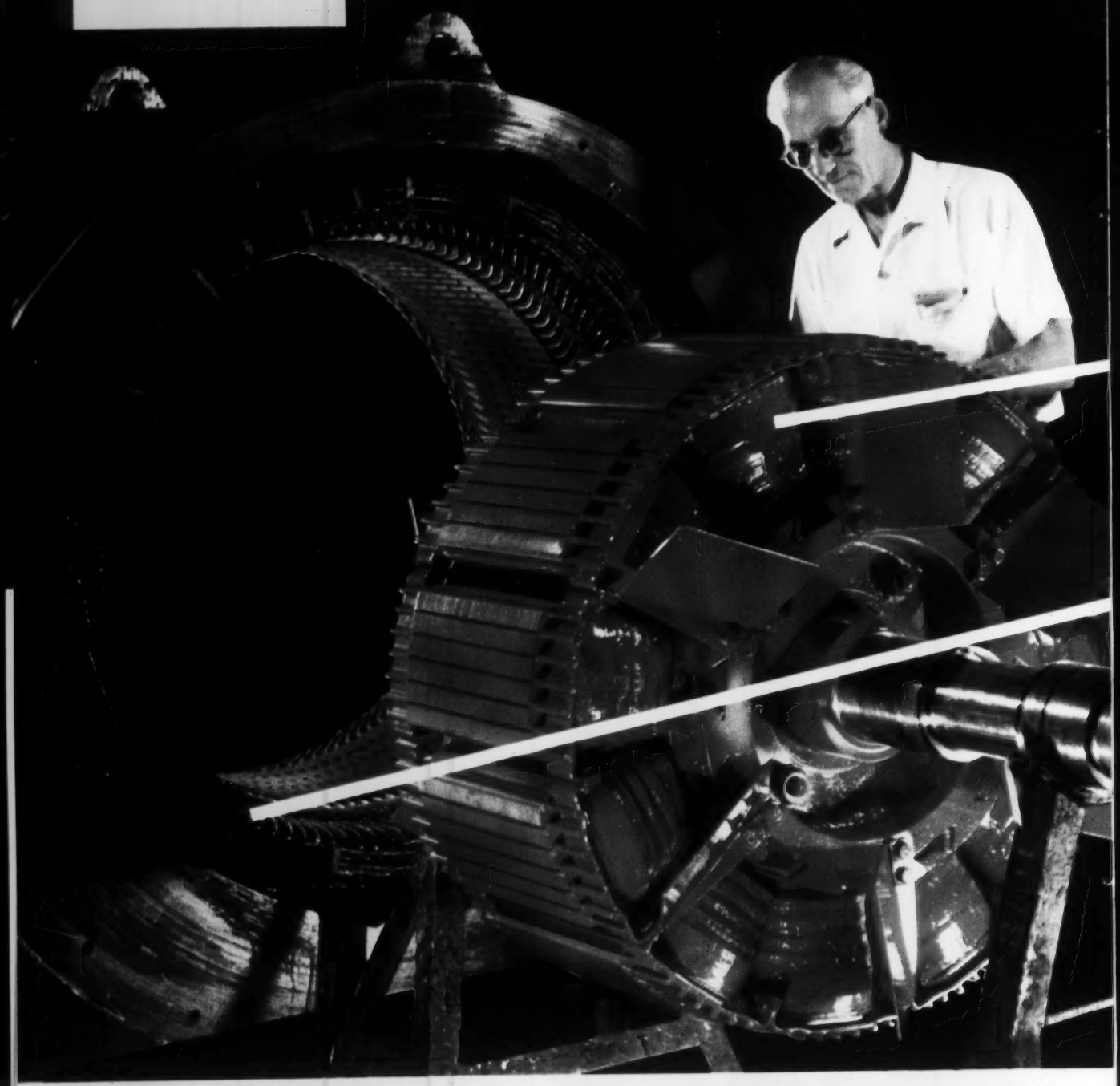
WAYTROLS take materials from overhead hoppers and feed them at predetermined quantities or rates; so many ounces, pounds or tons per hour. They do this within the accuracy of the weighing equipment itself and without dependence upon the attention and judgment of the operator.

Weighing, batching and proportioning systems are described in Catalog 841. For a copy, write The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

ONLY Allis-Chalmers



ALLIS-

MOTORS are "double protected"

New Integrated Field Coils Plus *Silco-Flex* Stator Insulation Provide Superior Motor Protection . . . Under Any Operating Conditions

1

Integrated Field Coils are bonded in heat-stabilized resins, enclosed in a resin-impregnated sheath of oriented glass fibers and bond-locked on the pole structure . . . dimensionally stable to withstand heating and thermal shock, vibration and fatigue at elevated temperatures . . . sealed throughout against atmospheric contaminants and fully protected against destructive forces.

2

***Silco-Flex* Insulation** provides a homogeneous, void-free insulating wall of silicone rubber on stator coils. It is unexcelled in life and thermal stability at high temperatures . . . resistant to most chemicals, water, weather . . . outstanding in flexibility and resilience . . . able to withstand abrasion and corona . . . resistant to physical and mechanical forces.

Exclusive Allis-Chalmers "double protection" is available on large electrical machines with operating temperatures through Class B range.

Silco-Flex is an Allis-Chalmers trademark

For more information on these quality insulation systems contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin for Integrated Field Coil Bulletin 05R8525 and *Silco-Flex* Insulation Bulletin 05R8341

Allis-Chalmers "Double Protection" with integrated field coils and *Silco-Flex* stator coil insulation, adapts this 600-hp, 2300-volt, 600-rpm synchronous motor to the most severe operating conditions.

CHALMERS

A-C ALLIS-CHALMERS

A-5221

Gardner-Denver... Serving the World's Basic Industries

New tool balancers boost production... relieve fatigue

Seven new Keller Tool Balancers designed to increase production . . . reduce fatigue . . . prevent tool dropping damage. Three models for light suspension of screw drivers, nut setters, drills, tappers. Four models for heavy-duty balancing in 20—30—40—50 lb. capacities.

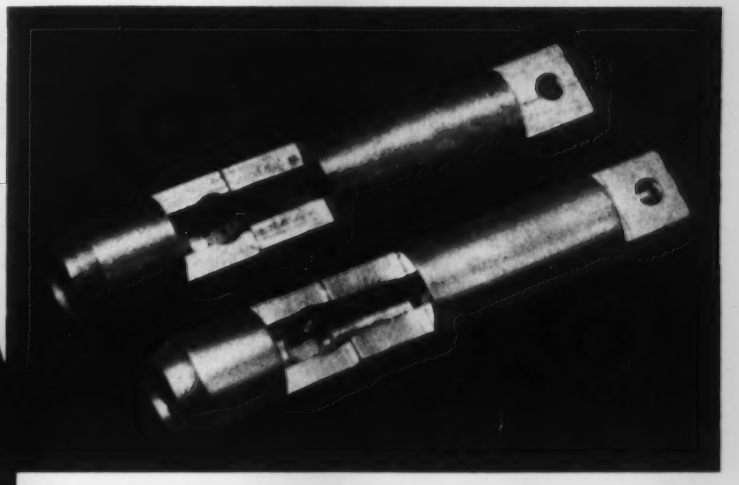
- ★ **LONG SERVICE—oilless alloy bronze bearings.**
- ★ **ADJUSTABLE CABLE STOP—shock-resisting bumper.**
- ★ **CABLE GUIDE—keeps proper position on drums.**
- ★ **STRAIGHT-LINE PULL—eliminates excessive wear.**

Many other features. Ask for Catalog Section 65.

GARDNER-DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY



The new ALUNDUM Tumblex "S" abrasive rolls around and through intricate parts; brings high uniformity of radii and surfaces, with smooth finish, to the barrel-finishing of parts as intricate as this gun component. The "before and after" view shows you how the spheres improve external and *internal* areas.

Besides this 3/16" diameter size of Tumblex "S" you can order it in four other sizes, up to 7/8". This means top barrel-finishing performance for you, in many different applications. And these new spheres are exceptionally dense and long-lasting.

Another big advance in barrel-finishing

Norton Tumblex "S" abrasive spheres

From the pioneer of ALUNDUM bonded triangles — now, new bonded spheres to help you do a better job*

If you finish parts that have hard-to-contact recesses or intricate shapes, Tumblex "S" tumbling abrasive is the latest development.

Here are the logical reasons why tubing, coil springs, scissor handles, bearing retainers, pump bodies and many other parts benefit by the new shapes and sizes of Tumblex "S" — and by its top-quality as a tumbling abrasive.

- *Tumblex "S" is made in spheres that easily get into areas where other abrasive shapes can't reach.*
- *It comes in five different diameter sizes. #2, 7/8"; #3, 5/8"; #4, 3/8"; #5, 5/16" and #6, 3/16", covering a big range of parts to be barrel-finished.*
- *Made of famous Norton ALUNDUM abrasive, it cuts fast — resulting in shorter time cycles and lower costs per piece finished.*

Send Your Work Samples

Let us demonstrate in our newly enlarged Sample Processing Department how Tumblex "S" Abrasive can give the value-adding "Touch of Gold" to your product quality and cut your barrel-finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-318

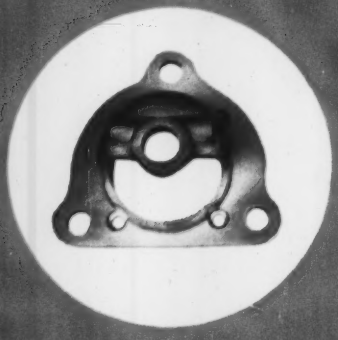
*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

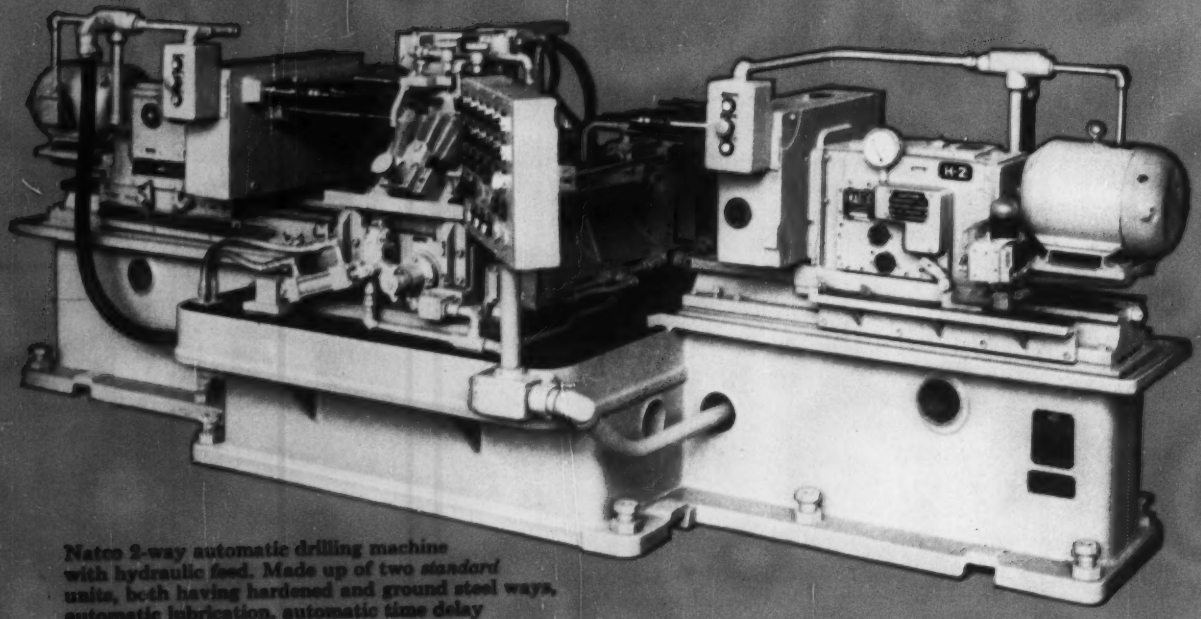
NORTON
ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes

Natco Standard Units Perform Special Jobs

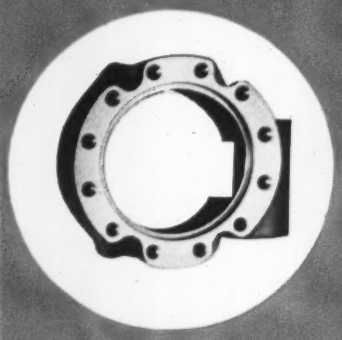


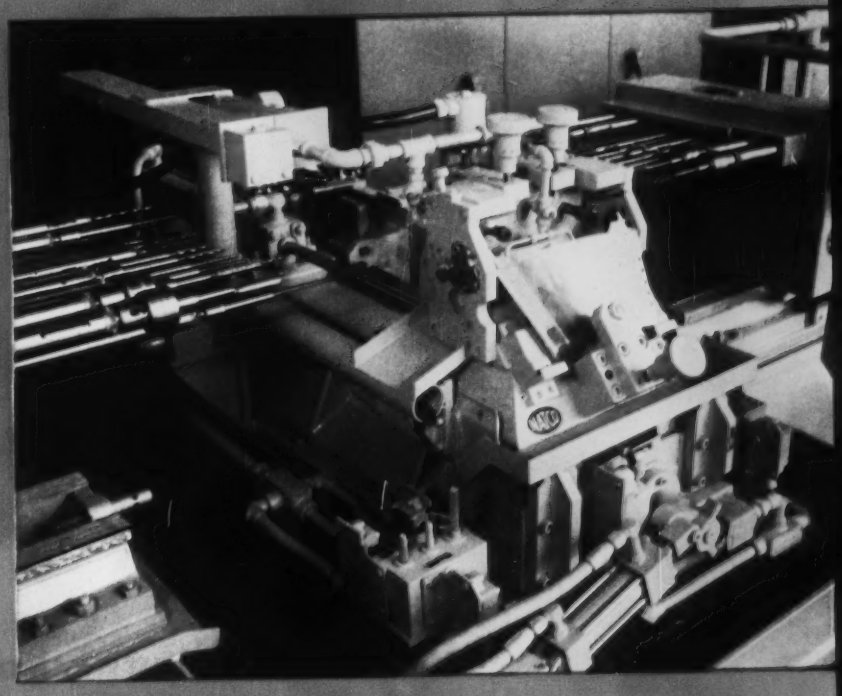


Natco 2-way automatic drilling machine with hydraulic feed. Made up of two *standard* units, both having hardened and ground steel ways, automatic lubrication, automatic time delay and positive stop.

Many *special* jobs can become routine with Natco's *standard* unit design. Take these parts, for instance. Unique parts presenting unique problems. Natco solved them by using *standard* horizontal, self-contained Holeunits with automatic fixtures. Varied operations are performed—production to meet customer's requirements.

Natco's use of *standard* units can mean quicker delivery and lower price to you. Call a Natco Field Engineer to determine whether Natco's *standard* unit design can solve your "special" problems.





Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

NATIONAL AUTOMATIC TOOL COMPANY, INC.

Richmond, Indiana

NATCO

Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

A new perspective to Springmaking

Multiple sources for "Things" not called SPRINGS

Yours to put to work . . . . our mechanical ingenuity and craftsmanship . . . . experienced in producing an infinite variety of metal parts in such fields as automation, communication, medical, electronics, safety devices, product development, etc. The capacity of ASC springmaking minds and machines is unlimited. Ask any Division to examine your sample or blueprint.

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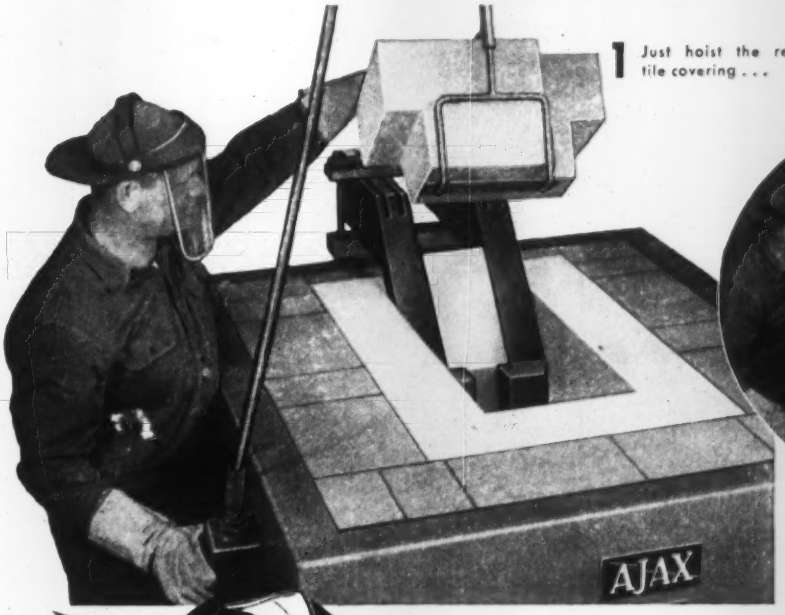
Divisions of

ASSOCIATED SPRING CORPORATION

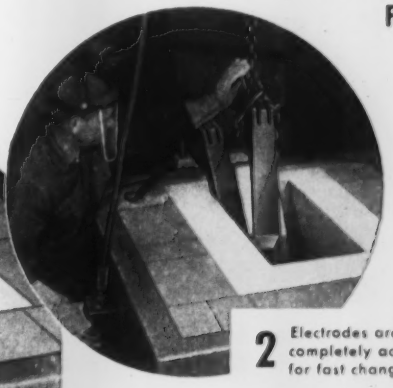
Now! CHANGE SUBMERGED ELECTRODES IN AN HOUR!

. . . without disturbing furnace casing or pot
. . . at substantial savings of labor, material and time



1 Just hoist the removable tile covering . . .

Another AJAX First!



2 Electrodes are now completely accessible for fast changing.

In this unique new Ajax Electric Salt Bath*, electrodes enter the furnace from over the top, *yet retain all the favorable characteristics of the submerged design.* They are replaced by hoisting a removable tile, putting in new ones and setting the tile back in place.

It's as simple as that! No need to disturb either the pot or furnace casing. "Down time" is held to an absolute minimum. Salt is saved. Spare casings are no longer required. A complete electrode change takes about an hour per pair. Often, the change can be accomplished before the molten salt can solidify.

Write for bulletin giving details of this revolutionary design feature for either new or old Ajax Electric Salt Bath Furnaces.

AJAX
electric
SALT
BATH
furnaces

ALL THE ADVANTAGES OF COMPLETELY SUBMERGED ELECTRODE DESIGN!

The removable tile covering seals the electrodes against air, thus giving all the advantages of submerged design including protection against oxidation at the salt line. Life of new type Ajax electrodes using no critical materials compares more than favorably with that of conventional nickel alloy electrodes in conventional-electrode furnaces.

*Patent Pending

AJAX ELECTRIC COMPANY
1952 FRANKFORD AVENUE, PHILADELPHIA 23, PA.

Associate Companies: Ajax Electric Furnace Corporation ● Ajax Engineering Corporation ● Ajax Electrothermic Corporation

WHEN IT'S *MOVING*...MAKE IT *TUBING*

Pound for Pound, Tubular

Wheeled chairs get stiff workouts in fast-moving paraplegic basketball. Tubular construction keeps them strong, safe, maneuverable. When it's moving, make it steel tubing.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Construction is STRONGEST!

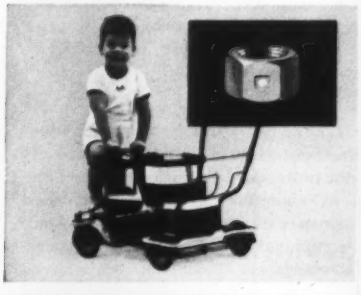
At any given weight, tubing is strongest of all mechanical shapes . . . stronger under compressive load . . . stronger as a beam . . . stronger in torsion.

And, dollar for dollar Republic ELECTRUNITE Steel Mechanical Tubing is your best buy. ELECTRUNITE is the original electric resistance welded tube. It's the quality tube of industry, available in a wide variety of forms, sizes and gages . . . in both carbon and stainless steel.

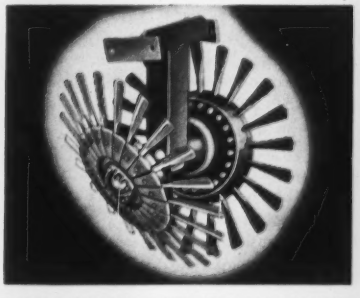
For volume production, ELECTRUNITE tubing is consistently uniform, foot to foot, shipment to shipment. It offers uniform wall thickness and concentricity. Surfaces are free from scratches and pit marks. It offers uniform response to heat treatment. It is easy to fabricate . . . often eliminates some costly fabricating or machining operations.

When your product must be strong, safe, lightweight, investigate Republic ELECTRUNITE Steel Tubing. Republic engineers can help you design it into your products and processes, economically and profitably. Send coupon for facts.

MORE REPUBLIC PRODUCTS MADE FOR MOVEMENT:



"I PUT REPUBLIC NYLOK NUTS TO THE TEST every time I ride my Taylor Tot," reports this young test driver. In spite of all the bumps, bounces and jolts, Nylok Nuts always hold tight. The reason: a special Nylon plug that assures positive locking in any position wherever you stop wrenching. Send coupon for details.



THESE BEET DIGGER TINES ARE 24% STRONGER since John Deere switched to alloy steel. Originally fabricated from carbon steel, they would sometimes break under stress. By taking advantage of alloy's hardenability—plus superior strength—bending and abrasion problems have been eliminated. Send coupon for complete data on Republic Alloy Steels.

DOUGLAS AIRCRAFT ADDED A PASSENGER—AT NO INCREASE IN WEIGHT on their new DC-7 superliner. How? By substituting Titanium for other metals normally used in nacelle construction. Republic is an old hand at this high strength-to-weight business. Send coupon for information on how Republic Titanium and Titanium Alloys may help your product.

STEEL

and Steel Products

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Please send me more information on:

☐ ELECTRUNITE* Mechanical Tubing ☐ Alloy Steels
☐ NYLOK* Nuts ☐ Titanium

*U. S. Pat. No. 2,450,694 and pending applications.

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(Advertisement)

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

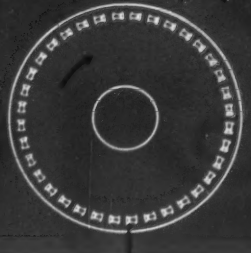
You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

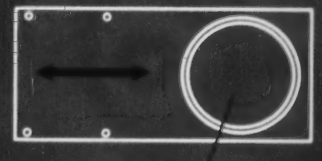
Gardner dual fixturing adds versatility

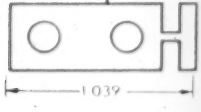
rotary carrier for small parts

interchangeable

gun-type fixture for larger parts







Production:
2100 parts per hour
Stock Removal:
.020" over-all, rough cut
.010" over-all, finish cut

Tolerances

Flatness:	.0003"
Parallelism:	.0003"
Uniformity:	.001"
Finish:	11 RMS

Production:
1 part every 40 seconds
Stock Removal:
.011" to .016"

Tolerances

Flatness:	.001"
Parallelism:	.0003" to .0004"
Uniformity:	.0008"
Finish:	11 RMS

Gardner Double Disc Grinder 115-20" with drawings of work carriers and workpieces.

grinds TWO parallel surfaces in ONE operation

GARDNER

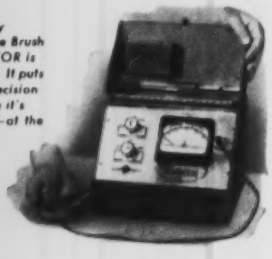
precision disc grinders

BELOIT, WISCONSIN

It's too late to check surface finish at final inspection

Overfinishing is costly—*and final!* Detecting overfinish after a part is completed can't correct it *or* restore wasted machine time. Underfinishing is also expensive because parts must be returned for re-work. Yet, checking of finish at final inspection has been common practice. In the past, only the inspector *could* make an accurate check of surface finish—not the machine operator.

On-the-spot surface finish checking was by feel or appearance. Consequently, surfaces generally were overfinished to pass inspection—far beyond any smoothness specified. Surface finish could not be measured where it was being produced—at the machine.



Weighing only 15 pounds, the Brush SURFINDICATOR is fully portable. It puts laboratory precision to work where it's needed most—at the machine.

Finish now controlled at machine

Now, Brush offers a remarkable new instrument that can be used *right at the machine*, as well as in the inspection department or laboratory. The Brush SURFINDICATOR* accurately and immediately indicates the exact surface finish produced.

Simple to use

The SURFINDICATOR can be used by anyone. The hand-held stylus is simply passed over the surface in question, and an accurate measurement in micro-inches is instantly obtained. It permits the machinist to check his work *as he works*, and provides him with a guide for further finishing. Fully portable and ruggedly built, it can be used anywhere in the plant, anytime.

The Brush SURFINDICATOR provides accurate surface finish control wherever needed—on metals, glass, plastic, paper, wood and other surfaces for maximum finishing economy.

Write for your free copy of this informative new booklet on surface finish control . . . it includes new ASA standards for surface roughness, waviness and lay.

It is important that you get complete information at once on the Brush SURFINDICATOR together with the new ASA standards for measuring surface smoothness. Both are contained in the new booklet offered—write for it today! *T.M.

BRUSH ELECTRONICS COMPANY

3501 Perkins Avenue, Cleveland 14, Ohio

BRUSH 6 ELECTRONICS

DIVISION OF CLEVITE CORPORATION

here's proof

This ogive was deep drawn from a sheet of Weirzin.
Photomicrographed cross sections from ogive are magnified 1500 times.

WEIRZIN Electrolytic Zinc-Coated Steel keeps a flawless protective coating even after deepest draws

The edge view cross sections shown above prove that approximately the same thickness of ductile zinc coating remains at the extremity of the draw, 4, as at the base, 1.

That's proof that even during a deep draw Weirzin's tightly bonded coating adheres evenly to its ductile steel base without peeling or flaking, and so continues to provide complete protection against rust or corrosion.

Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail this coupon today.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin

My product is _____

NAME _____

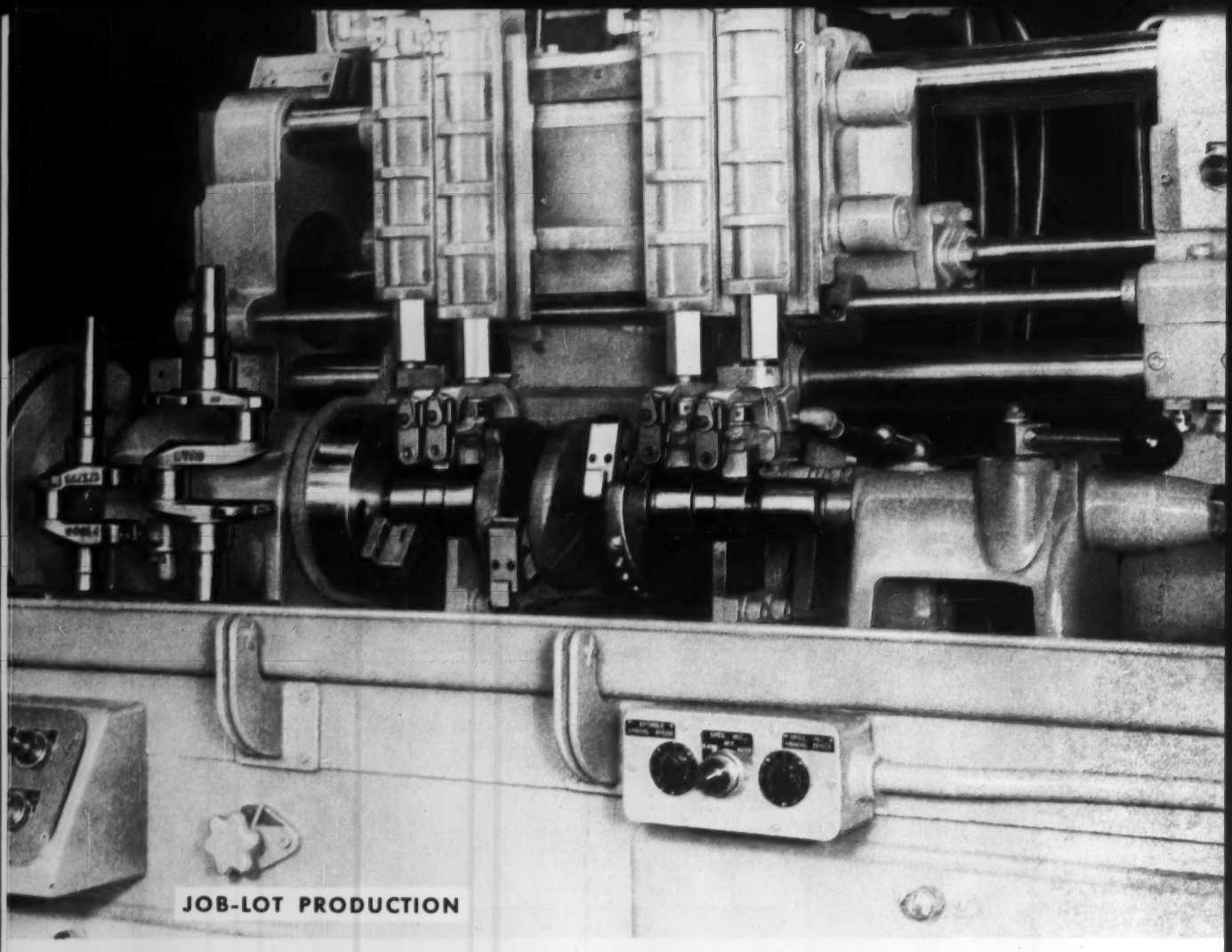
POSITION _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____

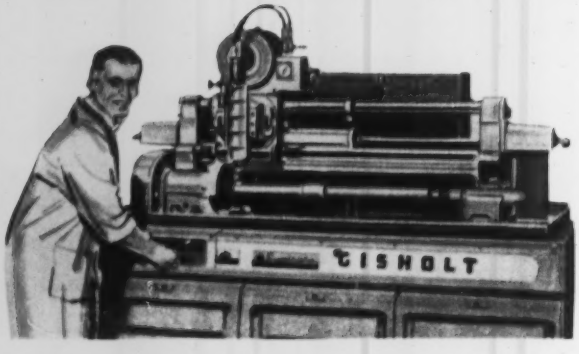
STATE _____



No. 51A General Purpose Superfinisher

CRANKSHAFTS in small job-lots are Superfinished with this setup—holding the piece between centers and driving from a keyway with a faceplate driver. Latch-on follower-type arms Superfinish the crank pins, while the main bearing and oil seal surfaces are Superfinished by standard overhead quills. Main and pin bearings are taken from a ground surface of 30 micro-inches down to 8 or less. Oil seal surfaces on shaft ends are Superfinished to 4 or less. Production: 44 to 53 pieces per hour at 80% efficiency.

NEED SMOOTHER SURFACES AT LOW COST? See the



BEEN LOOKING FOR AN INEXPENSIVE PROCESS to improve product quality—to help market your product easier against increasing competition?

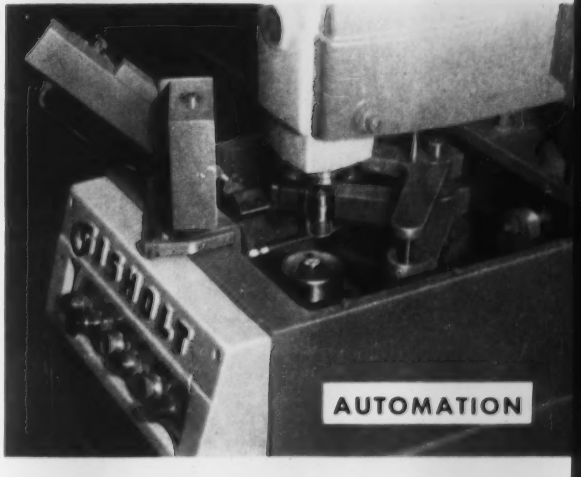
Gisholt Superfinishing may well be your answer ...it has been for some time for a long list of leading manufacturers.

With this modern process, you'll definitely reduce —or even eliminate—the cost and time of grinding, polishing or buffing operations. With the exclusive Gisholt Superfinishing method, you utilize a "scrubbing" effect through an abrasive stone which oscillates as the work rotates. Chatter marks, grind-

No. 4 Superfinisher Attachment

AXLE JOURNALS for railroad switchers are Superfinished with No. 4 Attachment on Gisholt Saddle Type Turret Lathe in this operation. In three steps, lathe finish of 200-250 micro-inches RMS is reduced to final surface finish of 8-10 RMS, removing .004" to .005" stock to eliminate tool marks. Through Superfinishing, 25 switchers logged 30,000 trouble-free hours on journals in first few months.

Superfinished tappet with .005-inch crowned top.



No. 81 High Production Superfinisher

CAST IRON VALVE TAPPETS are Superfinished in long runs on this job, featuring fully automatic handling with a work transfer device. Cup-shaped stones are used, Superfinishing from flat ground surface down to 5 micro-inches RMS or less—and rotating off center to generate .005" crown on the cam end of each tappet. In only 16 seconds floor-to-floor time per piece, the valve tappets are economically Superfinished for longer wear life and better product quality.

NEW GISHOLT MASTERLINE SUPERFINISHERS

ing flats, and amorphous "smear" metal left by grinding are completely removed. The true base metal is exposed—providing longer wear and better performance from your product.

Better still, most Superfinishing jobs are done in a fast, automatic cycle—producing very low micro-inch surface readings in the shortest possible time.

The jobs shown here are typical examples where Superfinishing solved production problems and improved product quality. Ask your Gisholt Representative to tell you about them—and many more—in full detail. Call him today!

WRITE TODAY for 30-page illustrated booklet "Superfinishers," explaining Gisholt Superfinishing process in interesting detail.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

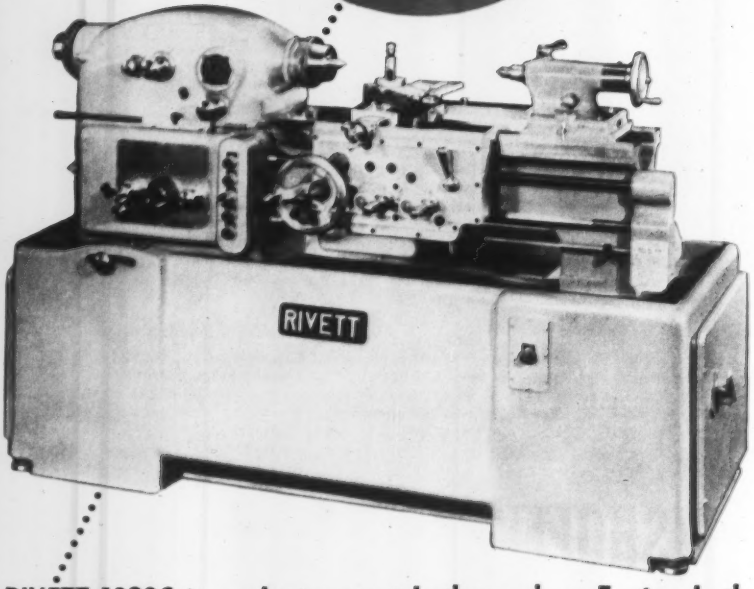
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

2 FOR 1

RIVETT 1020S

HAS WHAT IT TAKES TO MAKE AN OUTSTANDING LATHE

★ 40% heavier than comparable lathes. Weighs 3900 lbs. ★ Back gearing for power cuts—belt drive free of all gearing for high speeds. Range from 22 to 3600 R.P.M. ★ 12¾" wide hardened steel ways of bed absorb heavy cutting force. ★ Infinite spindle speeds through trouble-free mechanical drive. ★ Push button controls for complete operation. ★ Neutral clutch stops spindle without stopping drive. ★ Three bearing mounts for spindle. ★ Collets mount directly in spindle. ★ Hand wheel for turning headstock spindle ★ Anti-friction bearings used throughout. ★ Gear box gives 72 feeds and 84 threads from 2 to 240 per inch. ★ Automatic lubrication. ★ Hardened and ground feed screws.



RIVETT 1020S is an Instrument Lathe and an Engine Lathe

A double-duty machine—combining the feather-touch sensitivity of an instrument lathe with that heavy-biting ruggedness which carbide cutting tools require. This powerful geared-head lathe qualifies for any turning within its 12½" swing and 20" centers.

Bulletin 1020A has proof of how outstanding this Rivett would be in your shop. Write for copy today.

RIVETT LATHE & GRINDER, Inc.

Dept. ST-12, Brighton 35, Boston, Massachusetts

You can use other lathes . . . or employ other types of metalworking machines . . . but on no other tool can you get so much production with such fine precision as on a Rivett.

A Report from the

STEEL CENTER of Mid-America

SINCE GRANITE CITY STEEL 1878

INDUSTRY FINDS A PRACTICAL ANSWER TO THE LASTING, LOW-COST STRUCTURE: HIGH-TENSILE SHEETS, PIONEERED BY GRANITE CITY STEEL

John Marshall, Chairman of the Board and Chief Executive Officer, reports on industry's enthusiastic acceptance of high-tensile roofing and siding, developed by Granite City Steel.

"There's a big difference between knowing customer needs and coming up with the *right* product to meet them. A classic example in our industry was the tough job of perfecting a *high-tensile* steel sheet for industrial roofing and siding.

"For years, steel building fabricators recognized the need for a lower-cost industrial structure and asked for a covering that combined unusual strength with light weight. Many steel mills set out to develop a high-tensile sheet that offered both advantages . . . but it wasn't easy! Thousands of man-hours were expended. Years passed. Some abandoned the search. But finally, in 1945, a high-tensile sheet was perfected and introduced — by Granite City Steel.

"Called INDUSTRIAL HIGH-TENSILE, this product is nearly twice as strong as ordinary sheets, yet lighter in weight than sheets of heavier gage. It won't dent under blows that puncture conventional grades . . . is economical, fire-resistant and galvanized for long life.

"Today, Granite City Steel supplies INDUSTRIAL HIGH-TENSILE for all kinds of buildings. And leading the nation in acceptance of this product are the Midwest and Southwest where Granite City supplies most of the independent steel building fabricators. It's another reason why the future of Mid-America looks good to us."

High load-carrying capacity of Industrial High-Tensile saves on framework. Fire-resistant feature often affords lower insurance rates.

Industrial High-Tensile sheets lap snugly, keep weather out, provide one of the most economical, long-lasting structures possible.

FOR MORE INFORMATION, *write for "Industrial High-Tensile" folder (A.I.A. File No. 12-C-1). Address: Dept. S-63, Granite City Steel Co., Granite City, Ill.*

GRANITE CITY STEEL

And subsidiary: Granco Steel Products Co.

Granite City, Illinois

Cupola Output

nearly anyone can obtain
but it takes cupola specialists
to make operation profitable!

If you are planning the installation of a cupola now or in the near future, or even if you believe your cupola is operating successfully, it will definitely pay you to consider the latest developments that "tailor" the cupola to meet your particular metal requirements. Whiting has made many advancements, not only in cupola design but also in equipment used in conjunction with cupolas, that lead to better metal at lower costs.

In designing and planning a new cupola, for example, the application of scientific principles in construction and arrangement of tuyeres is necessary to provide the proper volume of air to the coke bed. Tons of coke a day can be wasted through mis-use or improper arrangement of tuyeres. Blast, blowers and many other operation factors should be investigated. Fortunately, a great deal can be accomplished with old cupolas. Usually they can be easily modified to incorporate the latest Whiting cupola accessories.

For seventy-two years Whiting has engineered and manufactured cupolas and cupola accessories. Whiting engineering service includes (1) analyses of requirements, (2) layout and selection of equipment, (3) manufacturing supervision, (4) supervision of erection, (5) initial operation, and (6) periodic field checkups. Talk over your plans now with a Whiting engineer!

WHITING CORPORATION, 15643 Lathrop Avenue, Harvey, Illinois

WRITE FOR THESE INFORMATIVE BULLETINS

Here are seven bulletins from Whiting's extensive library on cupola design and operation that will help you in considering improved methods and ways for obtaining maximum output from your cupola. Send for any or all of the bulletins you need—today! When ordering, please specify by "FO" number shown.

FO-2 Tips on improving cupola charging

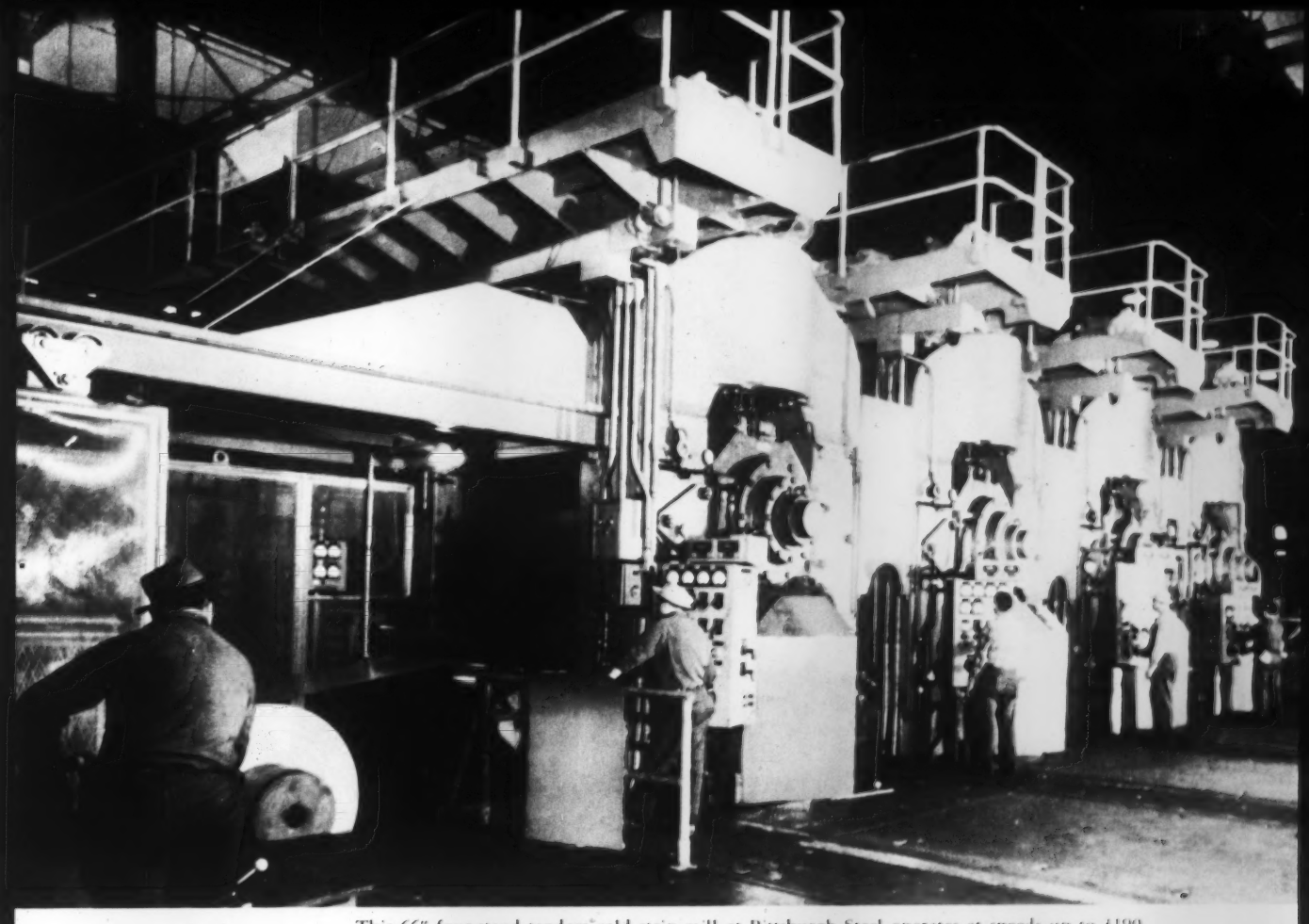
FO-3 Hot-blast

FO-5 Here's how to save melting fuel

FO-7 Cupola blast control

FO-8 Suggestions for solving some cupola operation problems

FO-9 Review of foundry-cupola gasses and temperatures



This 66" four-stand tandem cold strip mill at Pittsburgh Steel operates at speeds up to 5190 fpm maximum, has 17,700-hp total drive motor capacity.

Higher speed . . . more on-gauge strip

with Westinghouse Magamp* regulators on coordinated mill drive systems

In March, 1954, the first tandem cold reduction strip mill controlled entirely by Westinghouse Magamp magnetic amplifier regulators was installed at the Pittsburgh Steel Company, Allenport, Pennsylvania. This control's performance since then has resulted in higher permissible operating speeds and more on-gauge strip. Practically no adjustment or maintenance has been required on the mill stand and reel regulating equipment.

Two other four-stand tandem mills with individual generator power supply and all Magamp control are operating successfully, and equipment for four additional mills is being manufactured or installed.

*Trade-Mark

See how Westinghouse coordinated drive systems are Magamp controlled for greater productivity

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

Precise Magamp power control yields . . .

More on-gauge strip at 6000 fpm and beyond

More on-gauge strip during acceleration, deceleration and rated speed rolling are yours with Westinghouse Magamp regulators . . . even with the trend toward greater power application. Results are fewer waste ends, increased productivity.

A Magamp regulator system delivers optimum over-all mill performance because it properly regulates and improves the response characteristics of mill and reel motors and power supply generators.

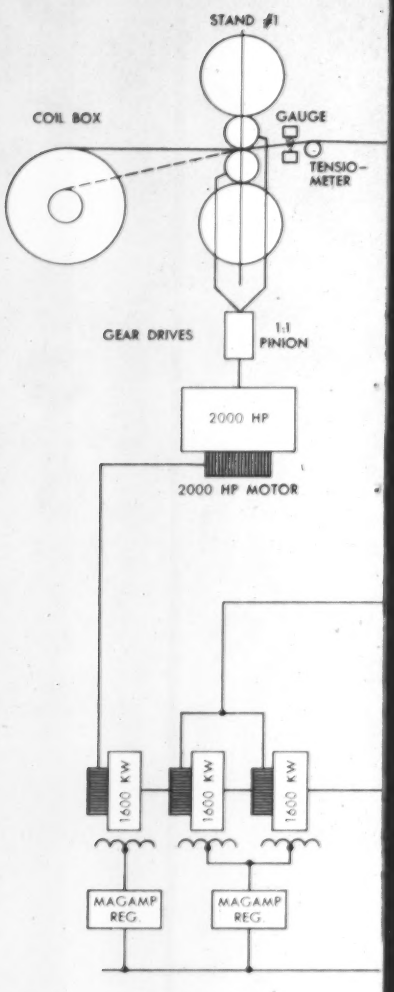
Magamp's high amplification and extremely short response time assure accurate generator voltage control. Operation from 400 cycles gives fast response and inherent stability without complex or critically adjusted damping circuits. Here's how the system works:

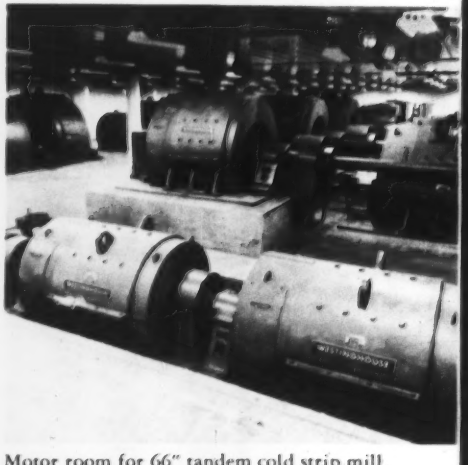
DRIVE ARRANGEMENT—Working rolls in mill stands one and two are driven together through pinion stands. Upper and lower rolls in stands three, four and five are driven separately through offsetting speed-up gears, the 6000-hp #5 drive consisting of two 3000-hp, double-armature motors. Winding reel motor is 1500-hp, triple armature. Each stand and reel drive is supplied from separate generators, on two motor-generator sets with duplicate 12,000-hp synchronous driving motors.

MAGAMP REGULATOR CONTROL—Generator(s) for each stand and reel power supply is controlled by a Magamp voltage regulator, operating on 400-cycle, three-phase supply from an alternator set.

AUTOMATIC GAUGE CONTROL—Strip thickness gauge at stand one controls stand one screwdown to minimize variations in starting hot strip and to feed uniform strip to rest of mill. Gauge at stand five controls stand five motor speed, and tension between stands four and five to maintain constant gauge of finished strip.

TENSIOMETERS—Units between stands indicate total tension and difference in tension between two edges of the strip.



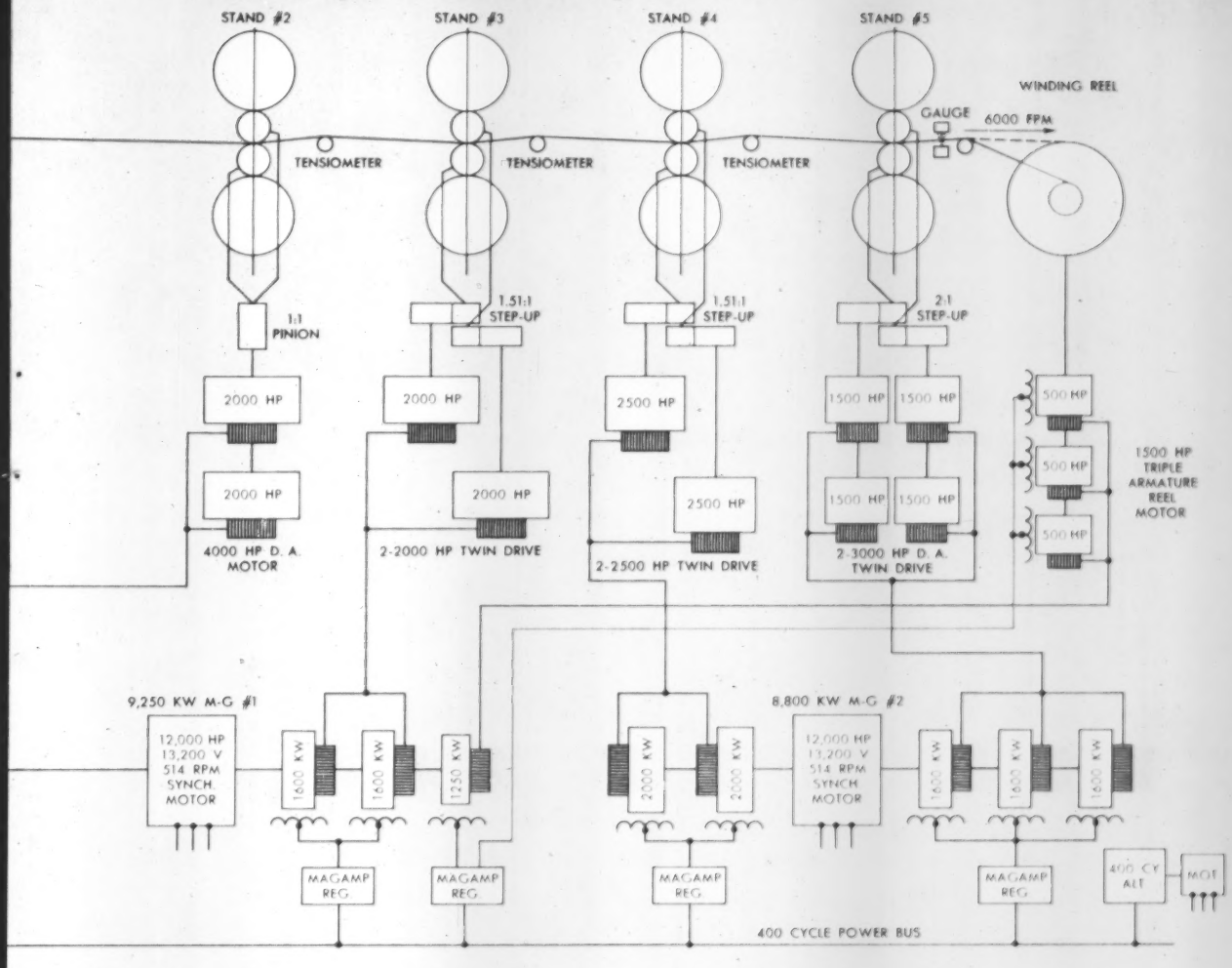


Motor room for 66" tandem cold strip mill.

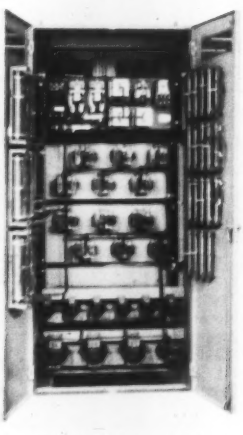
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

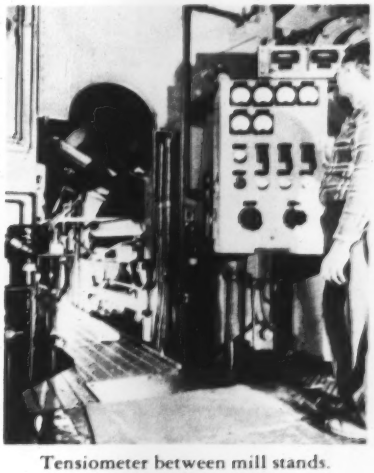
6000 fpm tandem tin plate mill



A 48"-wide five-stand mill like this is now under construction for the Wheeling Steel Corporation. It will have 22,500-hp total drive capacity to produce tin plate and heavier strip at speeds up to 6050 fpm.



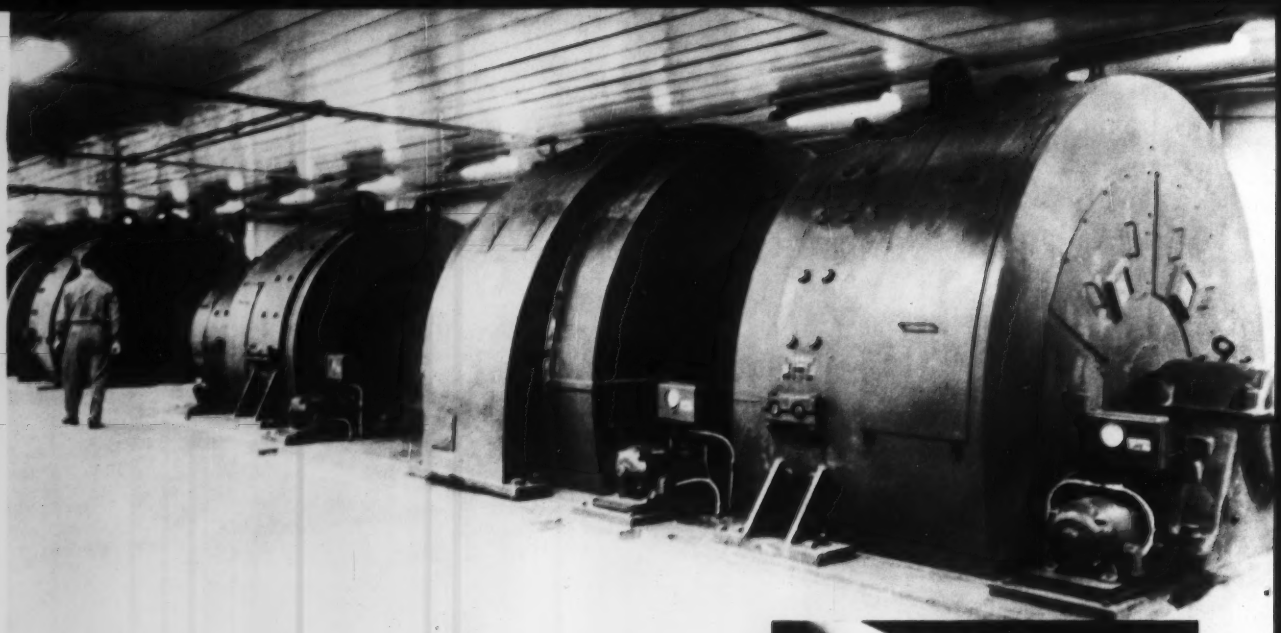
Magamp regulator cabinet.



Tensiometer between mill stands.

Progressive users of Magamp regulator control on tandem cold strip mills

PLANT	YEAR	STANDS AND WIDTH	DELIVERY FPM	TOTAL HP
Pittsburgh Steel Co. Allenport, Pa.	1954	4—66"	1595/3190	17,700
Alan-Wood Steel Co. Conshohocken, Pa.	1954	4—32"	1100/2293	6150
Empire Steel Corp. Mansfield, Ohio	1955	4—52"	747/1868	8100
Usinor Montataire, France	1956	4—66"	1375/3630	19,450
Nonferrous—Ohio	1956	4—32"	850/2075	4400
Steel Mill—Ohio	1957	3—80"	747/1670	13,000
Wheeling Steel Corp. Yorkville, Ohio	1957	5—48"	2750/6050	22,500



Westinghouse Exclusive!

Thermalastic® insulation excels in punishing steel mill duty

Twenty percent greater dielectric strength, ten times greater voltage endurance, 30 times greater tensile strength . . . that's Thermalastic, an amazing insulation available exclusively from Westinghouse.

Thermalastic shrugs off moisture, high voltage and dirt . . . helps Westinghouse motors and motor-generator sets better withstand severe steel mill operating conditions.

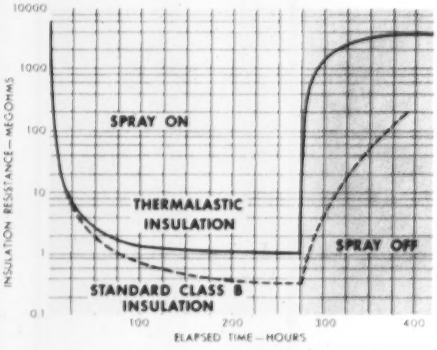
A chemically stable, highly moisture-resistant impregnating resin is used in Thermalastic. This, plus a high degree of fill achieved in the impregnating process, gives Thermalastic extraordinary properties that extend its life in hard service.

Remember, too, Westinghouse switchgear, control centers, ventilation equipment, and gearing are excellent working partners for your Westinghouse coordinated mill drive systems.

From planning to design, installation and start-up . . . Westinghouse is at your service. An experienced Westinghouse team will accept unit responsibility, and work with your engineering staff and consulting engineers in setting up your tandem mill drive.

Contact your Westinghouse sales office for further details. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. MP-3046

Thermalastic-insulated Westinghouse motor-generator sets (top photo) for 66" four-stand tandem cold strip mill.

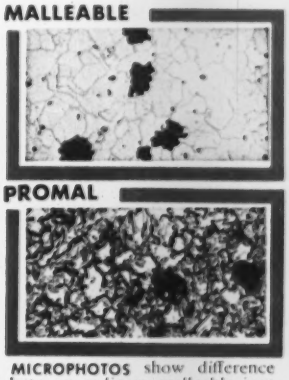


Results of typical laboratory spray test demonstrate superior moisture resistance of Thermalastic compared to regular insulation.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY**!*

Specify longer-lasting Link-Belt Promal chains for extra durability



MICROPHOTOS show difference between ordinary malleable iron and Promal. Upper—white areas in malleable microphoto represent "free-iron" . . . black shows soft nodules of carbon. Lower—the dark areas in the Promal structure show stronger, stiffer reinforcing material which strengthens metal and resists distortion and wear.

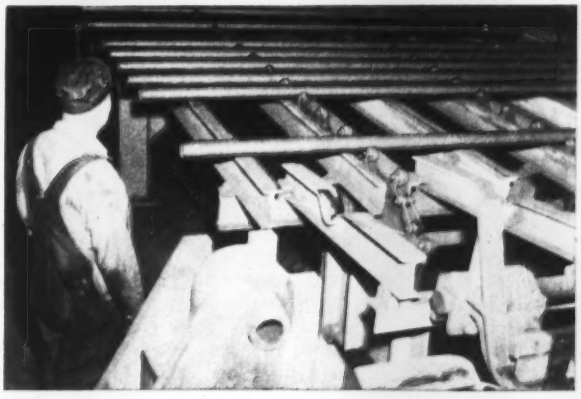
◀ **UP TO 475 TONS** of steel mill scale are recovered by this Link-Belt system. Class 700 Promal chain on Straightline Collector moves scale from settling tanks to discharge conveyor. Promal is especially suitable for long, heavy-duty conveyors and elevators.

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads — and wear resistance supplies the durability to cope with severe abrasion.

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasion.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.



Promal chain controls uniform cooling of pipe

An inclined conveyor, using Link-Belt Class 1100 Promal chain with attachments, permits an Ohio steel mill to control cooling of longer tubes than previously possible. Pipe is received from hot finishing operations at temperatures up to 1800 F. Controlled chain speed permits uniform cooling of outer tube periphery.

Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much longer . . . cost but a little more.

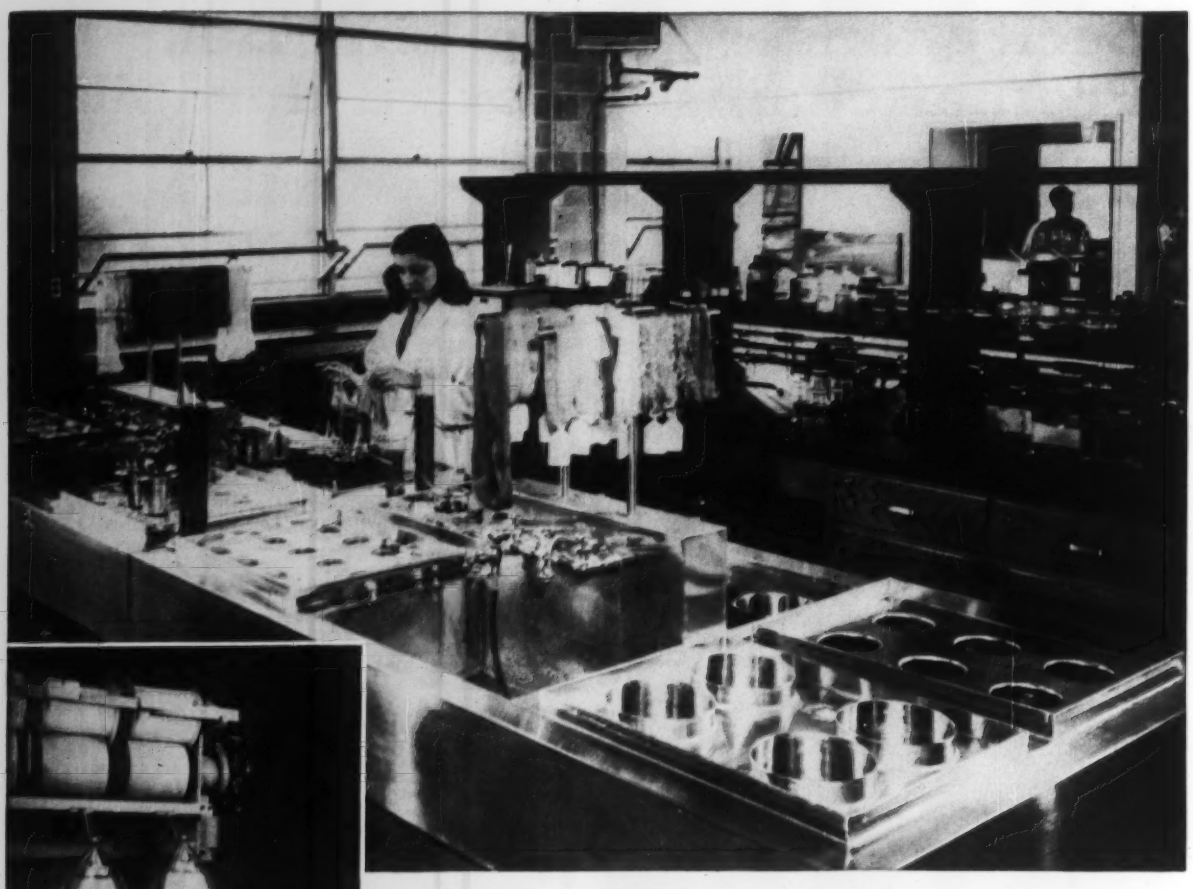
The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.

HEAT-RESISTANT PROMAL is recommended for temperatures up to 1000 F. This SMGL 618 Promal chain conveyor with riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure.

HEADQUARTERS FOR CHAINS, SPROCKETS is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

LINK-BELT
CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.201



Wherever you want to protect something

. . . that's a place for A-L Stainless Steel

In a textile plant, like the applications pictured above, Allegheny Ludlum Stainless Steel protects against off-colors in the dyeing and finishing department because it cleans up easily and quickly from batch to batch, leaving no traces of the previous dyes. In yarn twisters and other equipment in the weaving department, A-L Stainless provides the hard, smooth surface and high abrasion-resistance that protects against snagging and binding.

Food, beverage, dairy, drug and chemical plants use A-L Stainless Steel to protect the purity of their products; hospitals, hotels and restaurants use it to protect appearance and sanitary standards; cars, trains and planes use it to protect strength and safety. And they all gain a host of bonus benefits from stainless steel, too: such as far less cleaning and maintenance expense, far longer life in service, and far greater economy in the long run.

No other metal can match stainless steel in these qualities. In addition, A-L Stainless is easy to fabricate and we produce it in every form or shape that you may require.

● Let us help you to profit by it. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

Write for your copy of "STAINLESS STEEL IN PRODUCT DESIGN"

40 pages of useful engineering and fabricating data, including practical examples showing where, when and how stainless steel improves design, adds benefits, helps sales.

ADDRESS DEPT. S-84

For Stainless Steel in ALL Forms—call

Allegheny Ludlum

Warehouse stocks carried by all Ryerson Steel plants

AL® STAINLESS STEEL

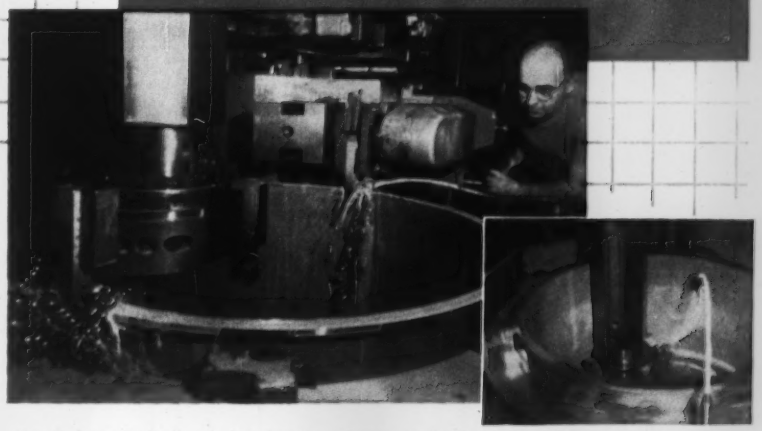
WSW 6082

PRODUCTION "at all time Peak"

with BULLARD

MAN-AU-TROL VERTICAL TURRET LATHE MODEL 75

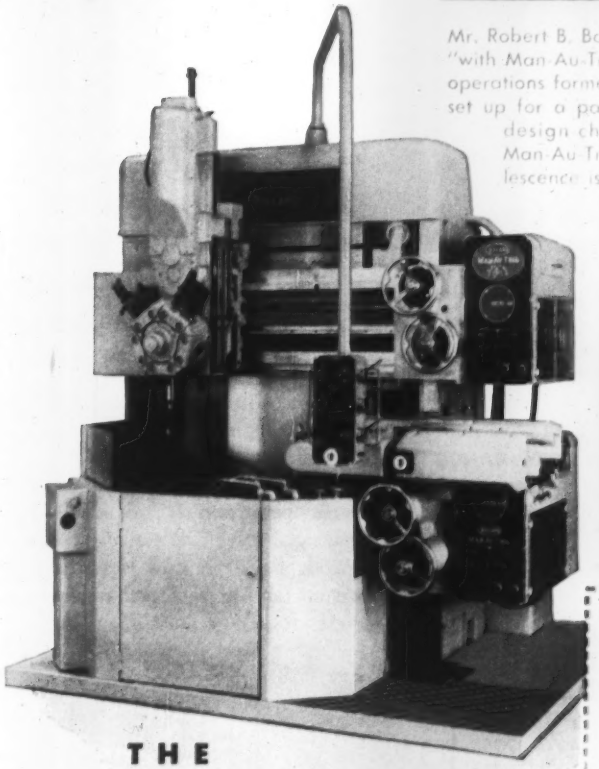
Solar Aircraft Company of Des Moines, Iowa and San Diego, California, has found the versatility and flexibility of the Bullard Man-Au-Trol V.T.L., Model 75 a distinct advantage in the machining and fabricating of various jet aircraft engine parts and assemblies.

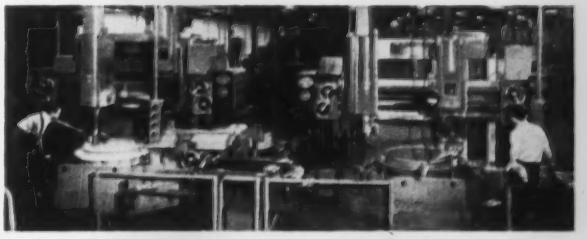


Mr. Robert B. Ballard, Production Manager at Solar-Des Moines, reports that "with Man-Au-Trol, Model 75, it is possible to do a multitude of machining operations formerly requiring numerous expensive machines which had to be set up for a particular operation, so limited in scope, that an engineering design change either obsoleted the tooling or the machine. With Man-Au-Trol, Model 75, because of its wide range of functions, this obsolescence is greatly reduced — if there is a design change, only a new set-up is made — not the purchase of a new multi-thousand dollar piece of machinery."

These same advantages can be applied to your manufacturing methods —

Ask your Bullard Sales Engineer for complete details.





THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

THE BULLARD COMPANY
286 CANFIELD AVENUE • BRIDGEPORT 9, CONNECTICUT

Please send me a copy of the
NEW MAN-AU-TROL V.T.L., MODEL 75 CATALOG

NAME .....

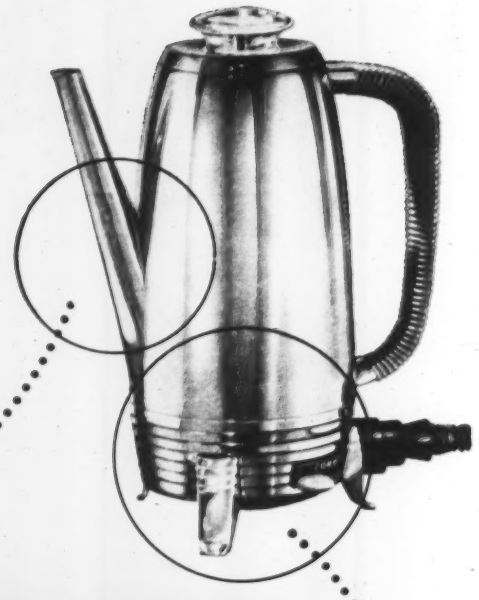
COMPANY ..... POSITION .....

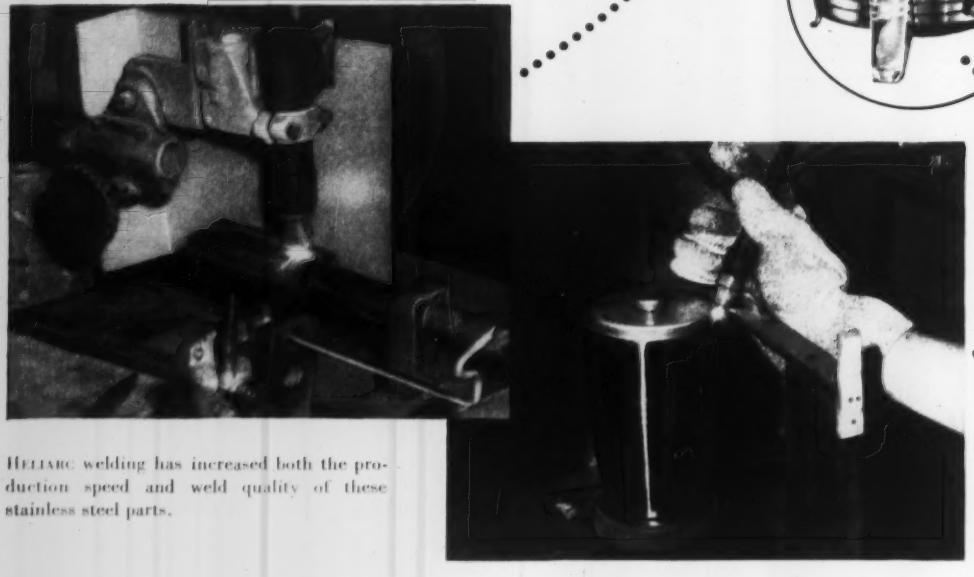
ADDRESS .....

CITY ..... ZONE ..... STATE .....

GAIN NEW SPEED AND WELD QUALITY

in light-gage metal fabricating





HELIARC welding has increased both the production speed and weld quality of these stainless steel parts.

Throughout industry, from production line operations to one-of-a-kind jobbing, HELIARC argon gas-shielded welding is helping fabricators gain new top weld-quality and production speed. These typical pictures show how HELIARC welding is used to efficiently fabricate sections of the Cory "Crown Jewel" percolator.

SETUPS DESIGNED TO FIT JOB NEEDS

These .031 in. type 302 stainless steel parts are fabricated in two fast, efficient operations. A mechanized HELIARC torch is used to butt weld a seam in the percolator's spout —and a stationary HELIARC torch welds the bottom section to the unit's body while parts rotate.

WELDING IS FAST, WELDS ARE SOUND

It takes only a few seconds to complete a 4½-in. long butt weld in the percolator spout. In the second HELIARC welding setup, a 17-in. circumferential weld on the percolator bottom is completed in only a fraction of a minute.

WIDE RANGE OF EQUIPMENT AND APPLICATIONS

HELIARC welding setups are available for manual, semi-automatic, and automatic operations. All are ideal for a wide range of light-gage metal jobs. Call your local LINDE representative and find out which HELIARC welding apparatus is best suited for your fabricating needs. Start saving now—call today.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

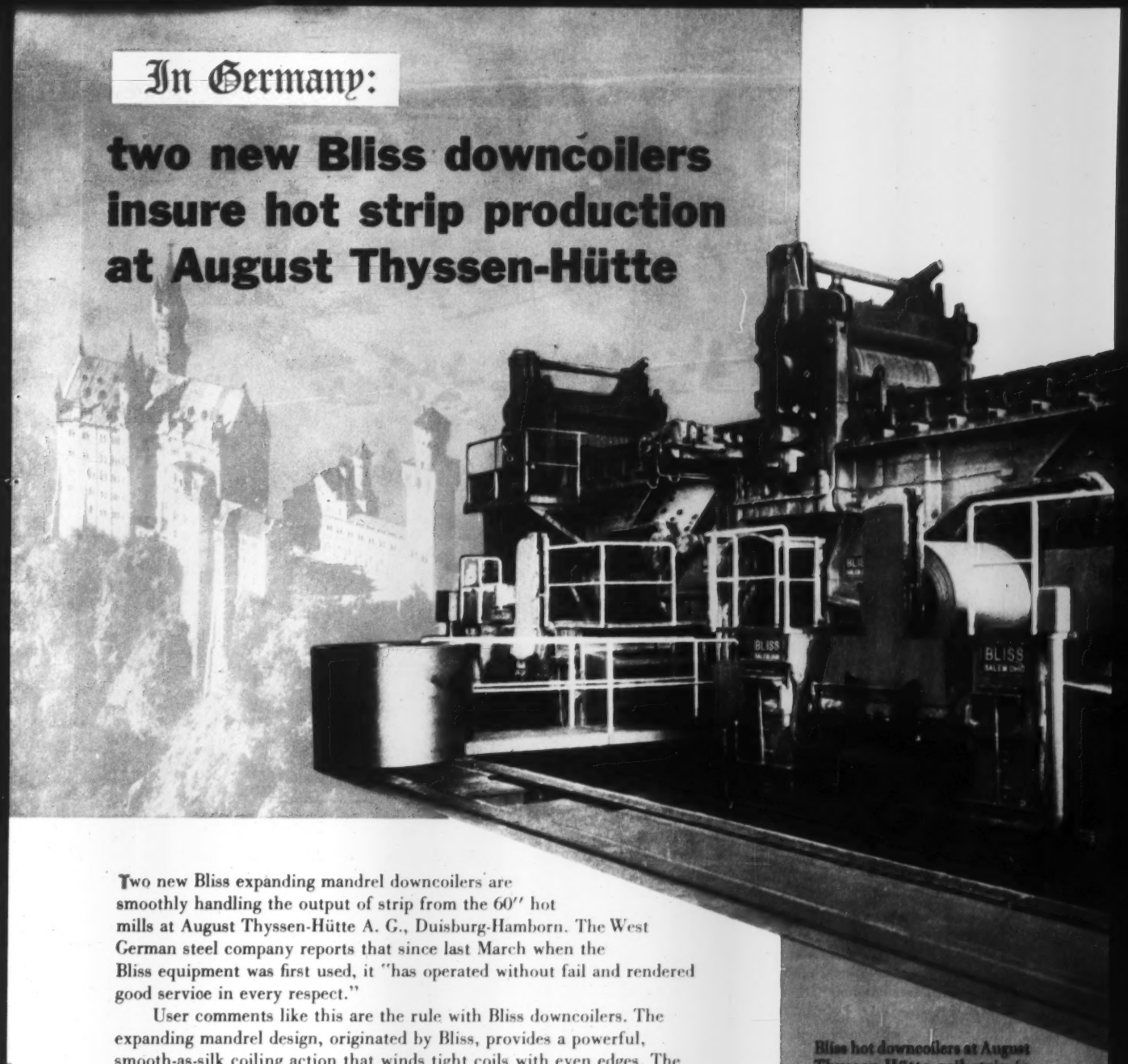
Division of Union Carbide Canada Limited, Toronto

"Heliarc" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde Trade-Mark

In Germany:

two new Bliss downcoilers insure hot strip production at August Thyssen-Hütte



Two new Bliss expanding mandrel downcoilers are smoothly handling the output of strip from the 60″ hot mills at August Thyssen-Hütte A. G., Duisburg-Hamborn. The West German steel company reports that since last March when the Bliss equipment was first used, it "has operated without fail and rendered good service in every respect."

User comments like this are the rule with Bliss downcoilers. The expanding mandrel design, originated by Bliss, provides a powerful, smooth-as-silk coiling action that winds tight coils with even edges. The blocker rolls touch the strip only when the initial wraps are made and the ends are being taken up. Thus, there is no scratching or surface damage during coiling.

You'll find Bliss equipment . . . and satisfied users . . . in rolling mills all over the world. To acquaint yourself with our products, why not write today for a copy of our 60-page Rolling Mill Brochure, Catalog 40-A? It's yours for the asking.

Bliss hot downcoilers at August Thyssen-Hütte coil strip in widths from 24″ to 60″. Mandrel diameter is 28″, and maximum coil O.D. is 56″. The two upenders were also designed and built by Bliss.

E. W. BLISS COMPANY
General Office: Canton, Ohio
ROLLING MILL DIVISION: SALEM, OHIO

BLISS
SINCE 1857

is more than a name... it's a guarantee

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Mich.; Pittsburgh and Midland, Pa.; San Jose, Calif. In Europe: E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France.

" . . . and this was accomplished without disrupting other work going on in area . . . and, more important, without an accident!"

Early last year, management of a large steel plant decided that its 90" Blooming Mill had to be replaced. Production requirements demanded that the down-time for making the extensive changes . . . including a complete tear-out of the old foundation . . . had to be held to a minimum.

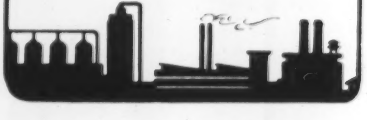
It was at this point that CHICAGO CONCRETE BREAKING COMPANY was called in for consultation. Realizing the vital importance of every hour to the plant, CHICAGO CONCRETE'S skilled blasting experts used a three-dimensional model of the foundations to lay out the drilling pattern. As a result of this careful planning, 95% of the drilling was accomplished PRIOR TO SHUT-DOWN OF THE MILL AND WITHOUT ANY INTERFERENCE WITH PRODUCTION.

Thus, blasting was performed simultaneously with the removal of the mill. Using modern methods, developed over 35 years of experience, CHICAGO CONCRETE was able to control-blast and remove 5,200 cubic yards of concrete and slag SOME 60 DAYS AHEAD OF THE TIME NORMALLY TAKEN BY OLD-FASHIONED METHODS. Needless to say, reconstruction was able to begin well ahead of schedule.

With careful planning, intelligent preliminary work, and skill . . . born of experience and developed over three decades . . . the job was completed in minimum time, ahead of schedule, and without an accident. This is but another example of the service available to you by CHICAGO CONCRETE BREAKING COMPANY . . .

AND NOW

CHICAGO CONCRETE CONSTRUCTION COMPANY offers a complete industrial construction service . . . handling anything from minor masonry, steel or foundation repairs to complete furnace rebuilds.

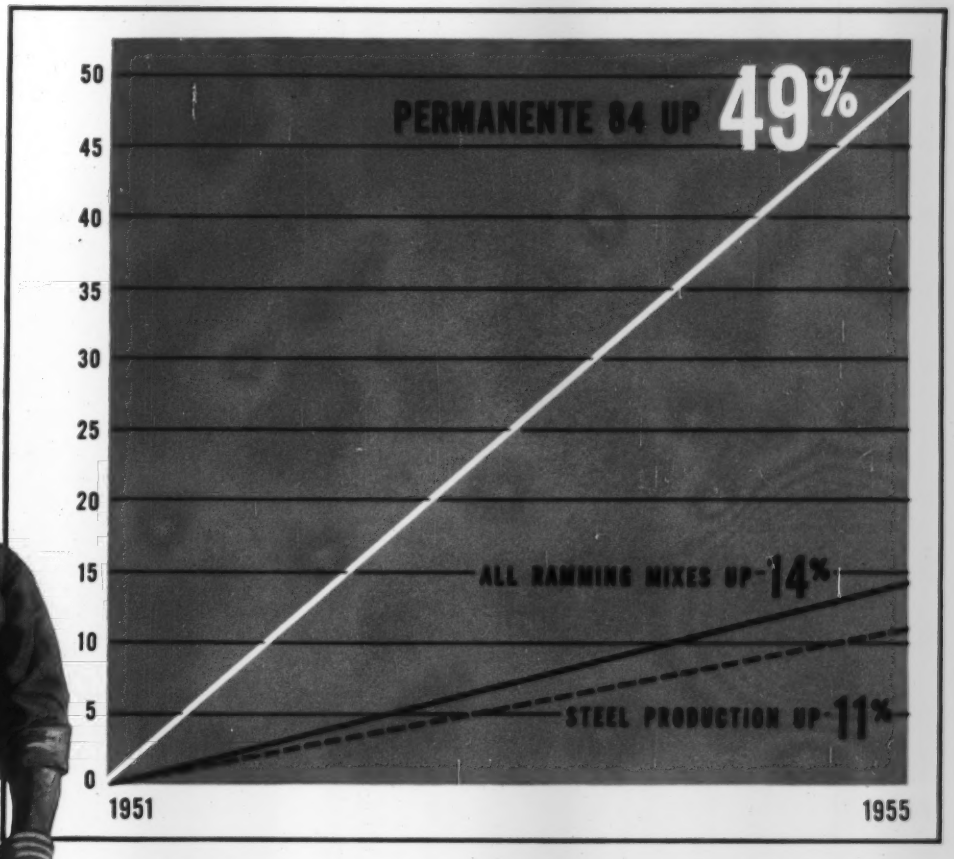


CHICAGO CONCRETE BREAKING CO.

EDWARD GRAY, PRESIDENT

12233 S. AVENUE "O", Chicago 33, Ill., BAyport 1-8400 — PITTSBURGH AREA - 213 Corey Ave., Braddock, Pa., Electric 1-1656

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS



Why this growing preference for Permanente 84 Ramming Mix!

As you can see from the chart above, sales of all ramming mixes to steel producers increased only 14% during the five year period ending December 31, 1955.

But during this same period, sales of Permanente 84 Ramming Mix increased *a whopping 49%*!

Why is Permanente 84 increasingly preferred by leading steel producers?

Briefly, here are the reasons:

Permanente 84 reduces the cost of maintaining furnace bottoms and banks. Repairs made with Permanente 84 stay put! Down time for hot-repairs is reduced because repairs made with Permanente 84 last longer. Steel production goes up—costs come down. Ideal for hot patching both open hearths and electric furnace banks and bottoms.

Order Permanente 84 now, and get extra steel tonnage at lower cost.

For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Building, HAMMOND, Indiana.

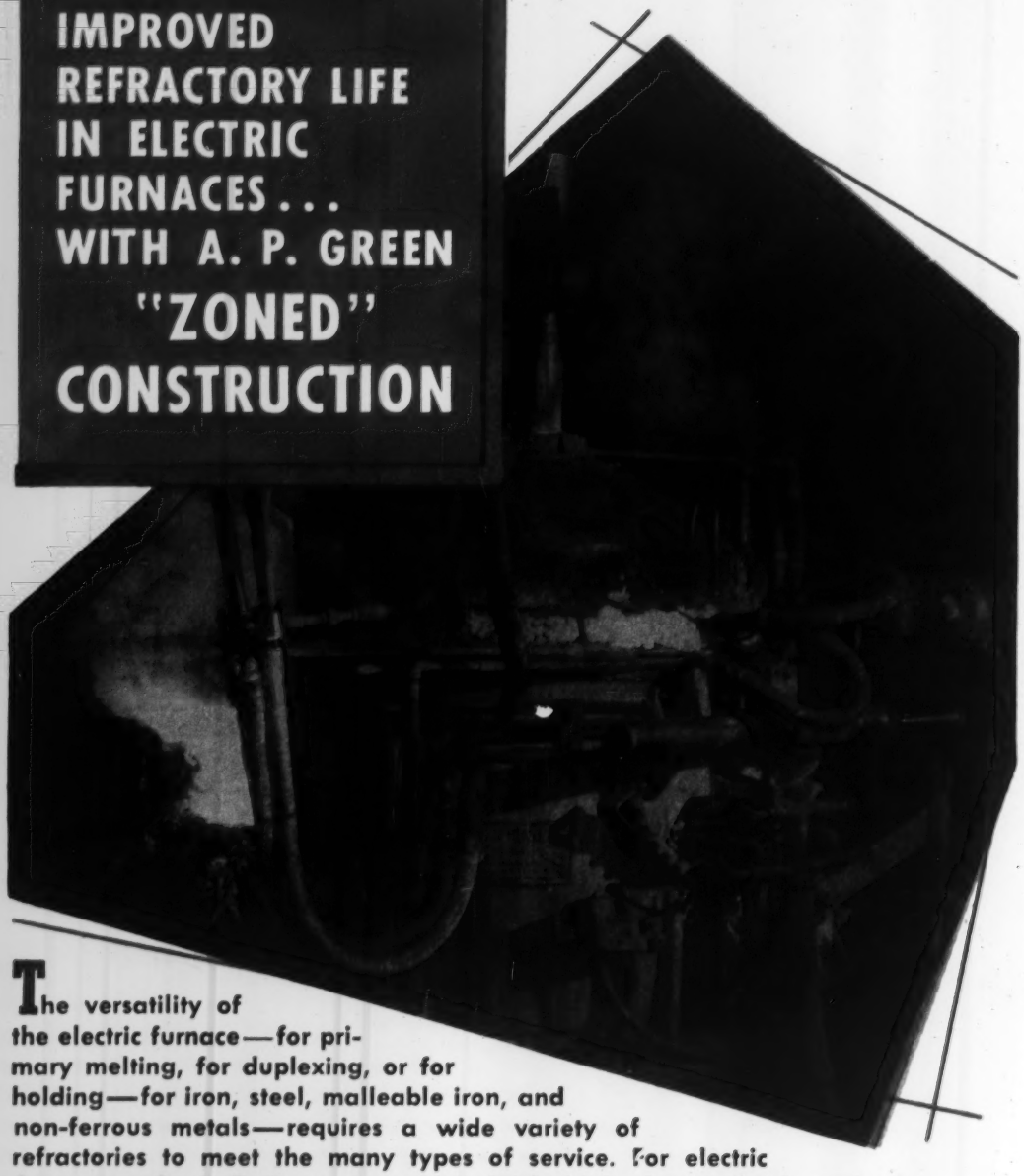
To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, OAKLAND 12, California. Dept. R6213.

KAISER **Kaiser Chemicals**

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

IMPROVED REFRACTORY LIFE IN ELECTRIC FURNACES... WITH A. P. GREEN "ZONED" CONSTRUCTION



The versatility of the electric furnace—for primary melting, for duplexing, or for holding—for iron, steel, malleable iron, and non-ferrous metals—requires a wide variety of refractories to meet the many types of service. For electric furnace roofs, A. P. Green super duty brick, high alumina brick, and monolithic refractories have performed outstandingly in many applications. Even in a specific installation, the service life of a roof may often be materially increased by the judicious combination of several types of refractories. Such "zoned" construction offers maximum economy.

For detailed information on service and specific recommendations —contact your local A. P. Green Representative or write

A. P. Green REFRACTORY PRODUCTS

A. P. GREEN FIRE BRICK CO.

Mexico, Missouri, U. S. A.
Plants: Mexico, Mo.—Woodbridge, N. J.
Sulphur Springs, Texas
In Canada: A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario

IDEAS...*on making the most of wire cloth!*

● Unless you're in the business up to your ears, you'd hardly be aware of the infinite variations that can be offered today in industrial wire cloth. Not only variations in the wire, metal, weave and mesh, but also in finishes, coatings, roll lengths, widths and packaging. And the *Reynolds Wire Division* of National-Standard has carried this flexibility to a high point in the industry.

So, you can see that it is mighty important for users or fabricators to probe today's possibilities carefully, and to be *sure* they are getting *the* wire cloth that produces best, performs best, minimizes waste, and costs the least for their particular production.

And that is exactly why *Reynolds Wire Division* goes all out in furnishing technical and analytical service—service that benefits customer after customer, small or large. This exceptional service is available coast to coast . . . wherever you are.

Are you open to some ideas on making the most of wire cloth? Do you have any particular production problems in the use of wire cloth? Let's discuss your requirements.

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

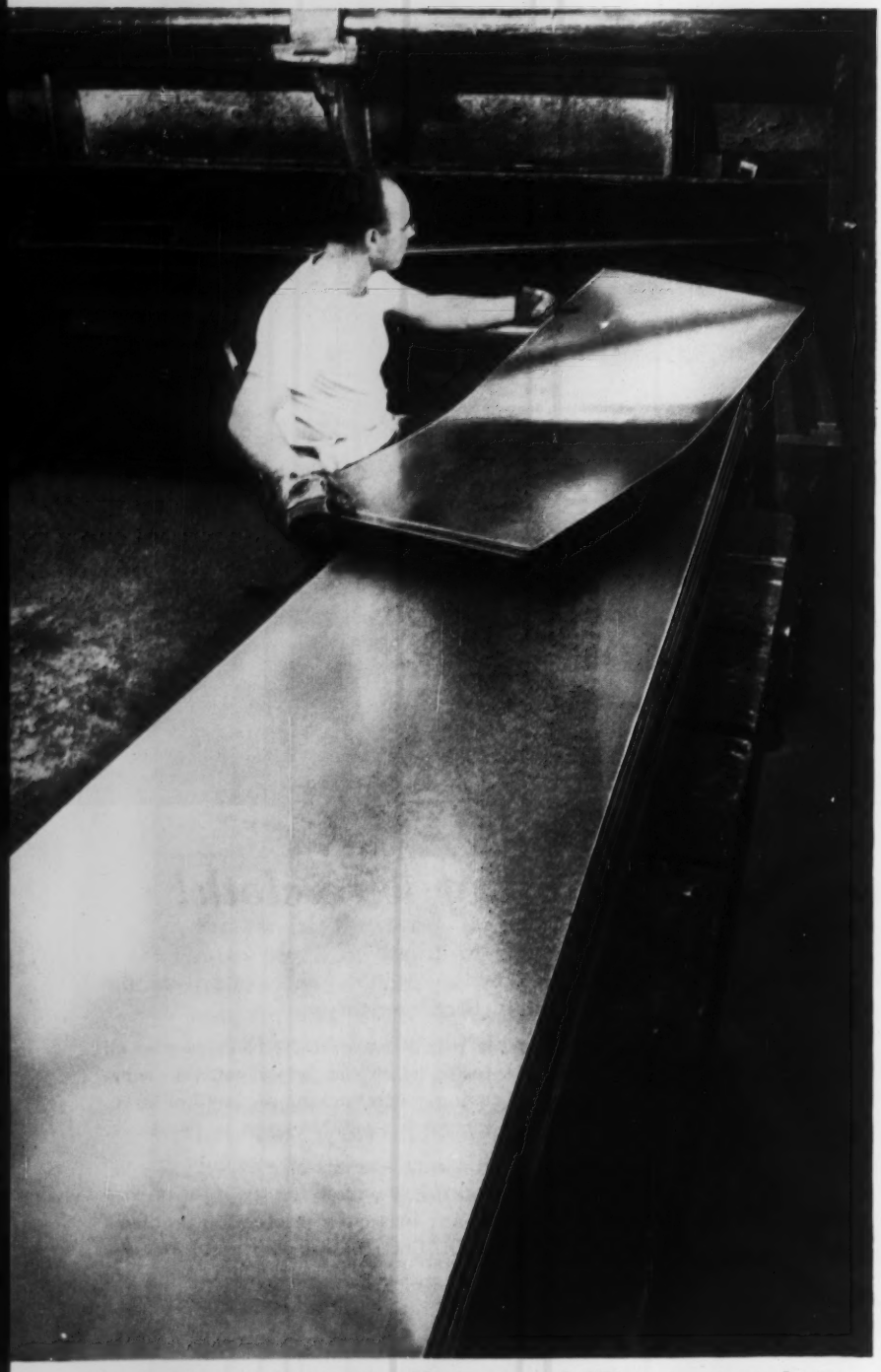
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS
NATIONAL-STANDARD
Company
NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

GF Gets "Dead Flatness" from Pittsburgh Sheet



Production of the Draft-a-Matic, one of GF's newest products, starts the same way as the dozens of other desk-type pieces of office equipment GF makes. Here a stretcher-leveled sheet of Pittsburgh Steel is being trimmed to exact size, the first of many trips it will make through a forming press.

(Advertisement)

Top Office Furniture Maker Demands Flaw-Free Steel

Forty-one cents from every sales dollar of The General Fireproofing Company —one of the oldest and largest manufacturers of metal office furniture—goes for purchase of materials. And steel makes up a major portion of this expense.

That means sheet steel like that supplied by Pittsburgh Steel Company is the most important single material GF uses. With such a heavy portion of its purchasing involved, GF can't afford to buy less than the best steel available.

In less than 50 years in the metal furniture business, GF has pioneered several steel office equipment products. It produced the first stock steel desk and is now the world's largest manufacturer in this line. It offered the first stock steel filing cabinet, was the first firm to successfully laminate a plastic top directly to steel.

In its big Youngstown, Ohio, plant GF can turn out more than 100 different models of chairs. As one of the top producers in the office equipment field, GF owes its position to the stress it gives three points:

- **The highest quality of materials.**
- **Intensive product development and research.**
- **Vigorous salesmanship backed up by a production skill arising from craftsmanship and ingenuity.**

Ever since it began producing sheet steel, Pittsburgh Steel Company has been supplying an important part of GF's cold-rolled sheet requirements. GF buys Pittsburgh's commercial quality sheets in regular finish ranging from .030 to .093 inch in thickness and from 2 1/16 to 52 inches in width.

Because of its long experience in metal furniture fabrication and the volume of its business now—in excess of 50 million dollars a year—GF has developed rigid, exacting standards for the steel it uses. GF flatness and surface finish standards are very rigid.

The two most critical standards Pittsburgh Steel meets are GF requirements for flatness and good surface finish.

To insure required "dead" flatness in the sheets it uses, GF goes a step

further than most of its competitors by both rolling and stretcher-leveling sheets before they are fabricated into the tops, sides, backs, drawers and doors of office furniture.

Steel sheet is run cold through a roller and is then elongated or stretched on a hydraulic stretcher, sometimes as much as one to three inches. Reduction in thickness is minor.

• **High Standards.** Ingrained dirt, pits, scratches, slivers, cross-breaks, deep rust or other defects—which might have appeared insignificant before stretching—often show up in the elongated sheet should inherent quality not be the best.

These defects, along with water stains, edge corrugation or even the slightest waviness, make the steel unacceptable to GF. When painted, pits and waves in the steel are highlighted. If the sheet is to be laminated with a synthetic covering, as in desk tops, it must present the flattest and smoothest surface possible to produce a good bond.

Some sheet steel can't take stretcher leveling and there have been instances, according to GF Director of Purchases Roy Mills, where GF had to eliminate the supplier entirely.

GF calls the finished Draft-a-Matic the most important advance in drafting room equipment in the past 50 years. Drafting space, calculating, storage and reference areas are incorporated in the same desk.

"That has never applied to Pittsburgh Steel's sheets," adds Mr. Mills. "We're entirely satisfied with Pittsburgh Steel from all standpoints of quality."

If Pittsburgh Steel's sheets can meet standards as high as General Fireproofing's, Pittsburgh Steel is a likely solution to your needs for a steel that has:

- *Top Notch Internal Quality* arising from its accurate chemical analysis and proper grain structure.
- *Superior Surface* which is clean, bright and reflective.
- *Flatness and Dimensional Uniformity.*
- *Shapeliness* imparted by inherent strength and formability.

There is an experienced Pittsburgh Steel sales engineer as close as your telephone. He's anxious to apply Pittsburgh Steel's 50 years of know-how and its completely modern sheet production facilities to solve your sheet problems.

A Draft-a-Matic channel results from this operation. Cut-length cold-rolled sheets from Pittsburgh Steel are free from surface scale, thus preventing die damage or imperfect cuts.

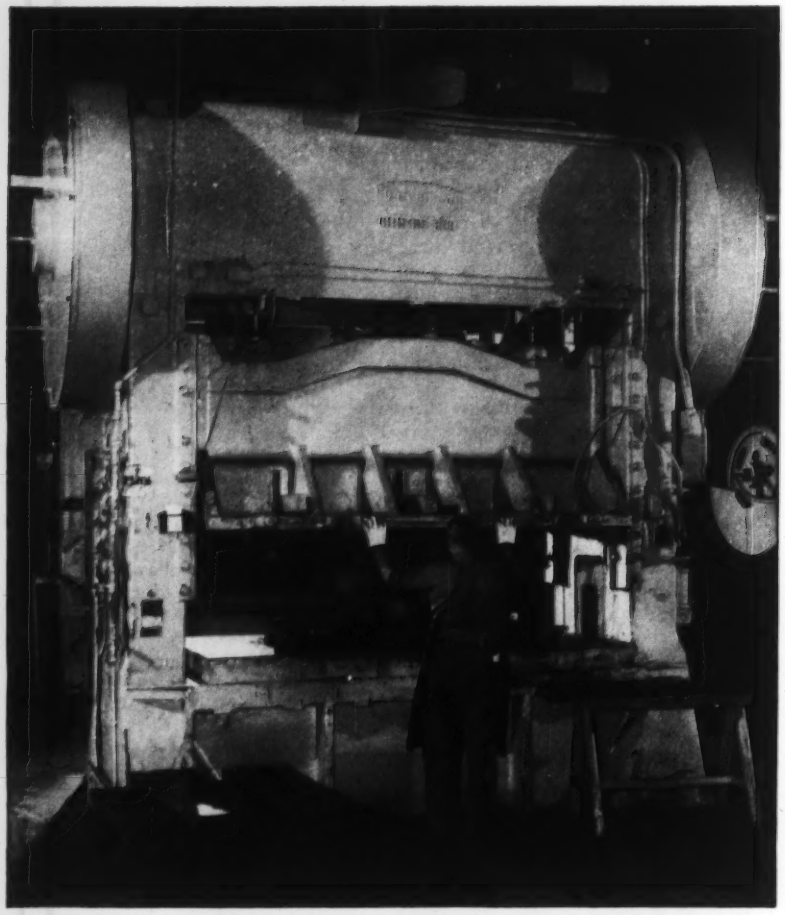
After the pedestal has been formed on a tangent bender, the Draft-a-Matic pedestal goes into this automatic welder. Twenty-four welds are made simultaneously.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices • Atlanta • Chicago • Cleveland • Columbus • Dallas • Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh • Tulsa • Warren, Ohio

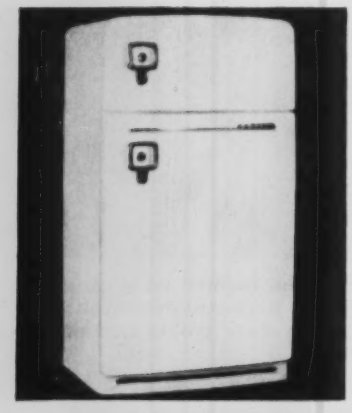
(Advertisement)



The Cleveland Double-Crank Press shown here draws more than seven parts for the famous Servel Refrigerator.

SERVEL, INC. finds Cleveland Presses

"require very little maintenance . . . have no clutch problems"



Installed in the Home Appliance Division of SERVEL, INC., Evansville, Indiana, in March of 1951, the Cleveland Double Crank Press you see here has been constantly "on the job" producing parts for famous Servel refrigerators.

Carl Linke, Foreman of the Sheet Metal Department, says, "This Cleveland 80D is a good press. We've used it for most of our draw work for the past five years. During this time it has required very little maintenance. We've had no clutch maintenance problems."

As have many of the nation's leading stamping departments, you, too, will find that Cleveland Presses prove themselves to be easy-to-maintain, low-cost producers. Before buying your next press be sure you have the complete Cleveland story. One of the 11 specialized types of Cleveland Presses is sure to be your answer to greater stamping economy. Write or call today!

THE CLEVELAND PUNCH & SHEAR WORKS CO.

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POWER PRESSES – FABRICATING TOOLS

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In aircraft, in vehicles, in the plant—
use turbine wheels made by Austenal **microcast**

Wherever you use power wheels – for supersonic jet engines, diesel engines, compressors or turbochargers – Austenal will make them faster, better and more economically. Wheels manufactured by Microcast are inherently of higher quality, more durable and more efficient than those made by other processes. Tolerances are exact – you have the wheel you need, flawless internally and externally, in virtually any size or configuration, many times with intricate design details unattainable by any other method. Think *Austenal* when you need turbine wheels. Demand the high quality and faultless performance Austenal assures manufacturers in all types of industry.

... *It's* **NEW** *from Austenal*

Austenal has developed a vacuum melting method for the high-temperature field to cast alloys not previously available. Write for full details.

Write today for Austenal's latest booklet, "Design with Microcast in Mind."

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microcast division
224 EAST 39th STREET, NEW YORK 16, N. Y.
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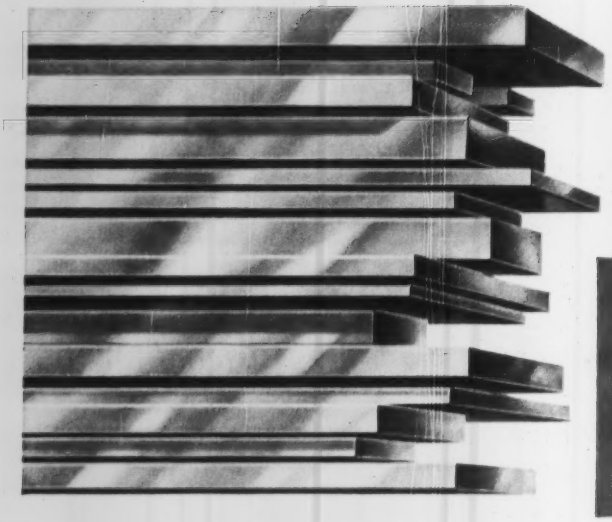
NOW square edge flat bars



IN FORMERLY 'HARD TO GET' SIZES AND GRADES

Now, Crucible brings you a *full range* of square edge flat bars in thicknesses from 3/16″ to 2¼″, and widths from ⅝″ to 6″. They're available in AISI alloy grades, MAX-EL steels, special Free Machining, Nitriding, and Tool Steels.

What's more, many popular grades and sizes are available from Crucible warehouse stocks. Most other grades are carried in billet form at the mill, where they are promptly available for rolling to your specifications.

Check with your nearby Crucible representative. He can supply square edge flat bars in the grades, sizes, and quantities you need – from a few short lengths to a mill shipment. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Shop Superintendent Bonnafe and Gulf Sales Engineer G. R. Burnham check on performance of Gulfcut 51A as turret lathe turns a stainless steel drive roll for a wire belt.

"Gulfcut gives us longer tool life,"

says Joseph Bonnafe, Shop Superintendent, J. W. Greer Company, Wilmington, Mass.

Shop superintendents like Mr. Bonnafe, engineers and machine tool operators *know* that production can be improved and costs lowered through the use of cutting oils designed specifically for the job. And, they know they can get the right oil for *every* job from the complete line of Gulfcut Oils. Reports like these come from the field every day:

From an aluminum plant: ". . . stepped up production of aluminum caps 25%, increased tool life well over 100%, and we're getting better threads."

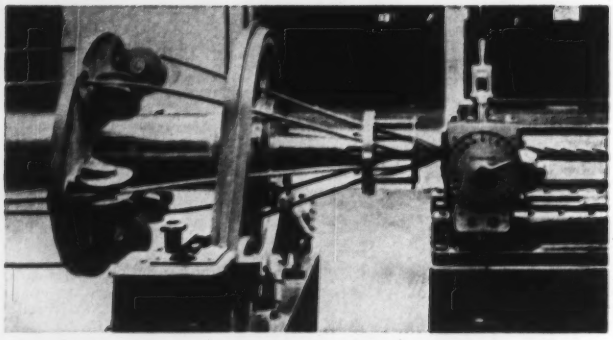
From a plant working tough titanium-alloy stainless steels: ". . . results were phenomenal. Tool life increased over 40% and surface finish was improved 43 microns."

Your Gulf Sales Engineer can pin-point your cutting oil requirements—can help you improve shop efficiency through the use of the most suitable cutting oils for your needs. Contact him today at your nearest Gulf Office.

GULF OIL CORPORATION
GULF REFINING COMPANY
1822 Gulf Building
Pittsburgh 30, Pennsylvania

GULF

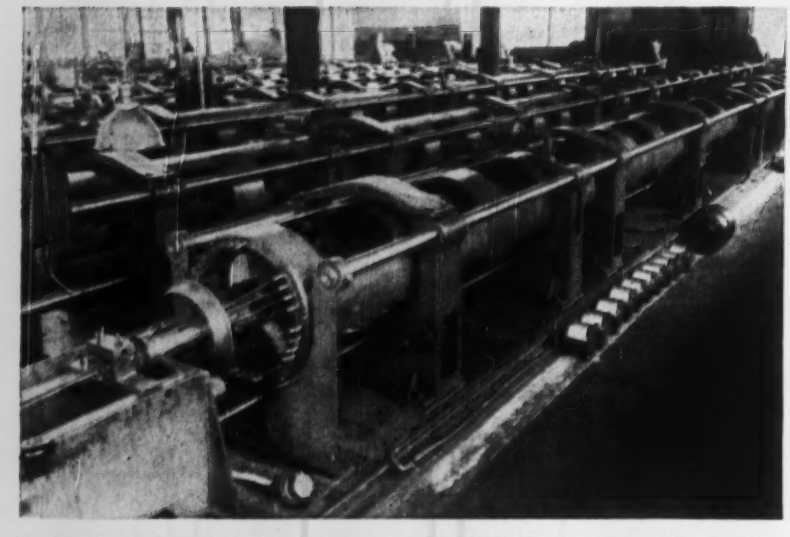
THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



This machine is capable of "closing" strands to make wire rope up to 3½-inch diameter. Six strands are closed around a core of either fiber or wire rope.

YOUNGSTOWN "YOLECTRO" ROPE WIRES

. . . built-in strength and safety keep your wire rope quality high



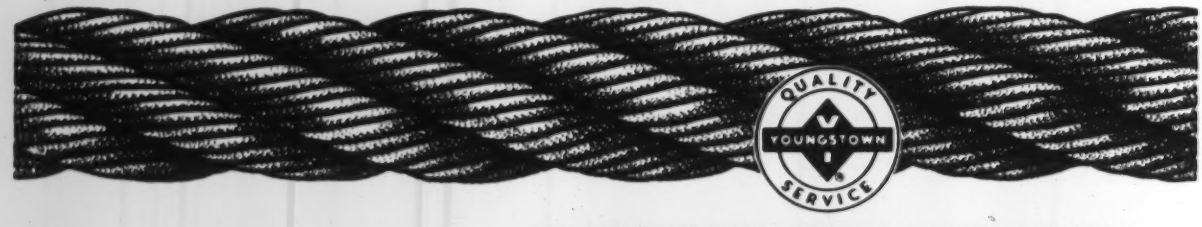
This bank of rotary stranding machines are busy producing wire rope at the St. Louis plant of H. K. Porter's, Leschen Wire Rope Division. Coils of wire are set in the open bays of the machines and conducted to the closing dies along the circumference of the barrel. They form from 7 to 61 wires into strands which are "closed" into a wire rope. Usually, finished wire rope consists of 6 or 8 strands closed around a core.

Wire rope must give long, trouble-free service or it's definitely a bad investment—both from a cost and a safety standpoint. To maintain their product quality, leading rope manufacturers specify Youngstown Yolectro High Carbon Rope Wire because it offers:

- Toughness and Strength
- Abrasion Resistance
- Gage Uniformity
- Proper Flexibility

Yes, this special, quality-controlled Youngstown wire provides the correct balance of properties to meet your most critical requirements. Why not make it your specification? It's available in both Bright and Galvanized finishes in all high carbon grades.

For additional information or metallurgical assistance, write or phone today to your nearest Youngstown District Sales Office.



THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Producers of Quality Carbon and Alloy Steels for Over Half-a-Century

Her wires are crossed *and she loves it!*

Peerless crosses them for her freezer basket and they're happy, too!

Besides freezer baskets, Peerless Wire Goods cross wire welds a variety of refrigerator shelves, fan guards, dishwasher racks, etc. And Peerless knows that keeping themselves and everyone else happy in such an extremely competitive business requires a lot of production ingenuity.

Here's why: Success in the wire products business depends on methods. And the sheer ingenuity of Peerless methods *requires* the capacity of Sciaky patented three-phase resistance welding equipment . . . which is not unusual, because the Sciaky technique of fabrication is designed to put the profits back into manufacturing!

Whether or not *you* make wire goods . . . if you fasten metals together to make your product, do it faster, better and at lower cost with Sciaky resistance welding techniques—like Peerless does.

SCIAKY

Largest Manufacturers of Resistance Welding Machines in the World

The facts are impressive—turn the page and see for yourself...

Ingenious Tool-Up Produces 45 Cross-Wire Welds per Stroke

Sciaky Patented Three-Phase Resistance Welding Readily Satisfies This Unusual Demand

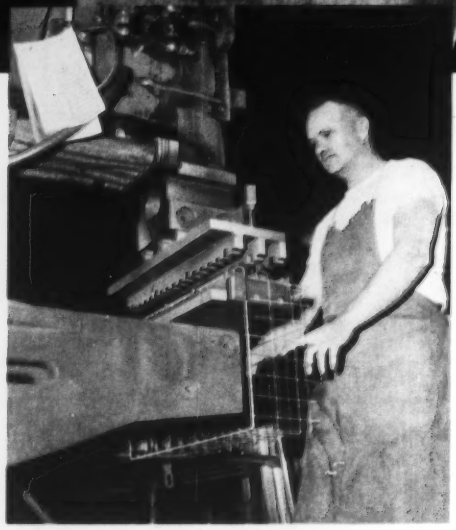
Imaginative tooling applied to a Sciaky 150 KVA patented Three-Phase press type welder has put Peerless Wire Goods, Inc., Lafayette, Ind., in a solid position in a field where the ultimate in efficiency of methods and equipment is necessary for survival.

In the fabrication of freezer baskets, for example, Peerless makes 45 cross wire welds simultaneously with one stroke of the welder, an unusual demand that can be satisfied only by the Sciaky patented Three-Phase principle of operation. Equally as important, Sciaky Three-Phase control eliminates burrs and splashes at the weld.

Dishwasher baskets have 124 welds made in twelve strokes—another big saving in time and handling.

Jobs like this provide good examples of the concept behind Sciaky Resistance Welding Techniques . . . *to put the profits back into manufacturing.*

Another example of how the Sciaky technique of fastening is used in cross wire products is given in "Resistance Welding At Work", Vol. 3, No. 9. Write for your free copy, today.



Upper—All the welds of a side web being made simultaneously. *Lower*—View showing the multiple electrode tooling that makes 45 welds per stroke.

FOR SPECIFICATION WELDING

If you must do precision welding such as required for air frame, jet engine and ordnance manufacture, ask about the new Sciaky Predetermined Electronic Counter Weld Control. Write for Bulletins 338 and 339.

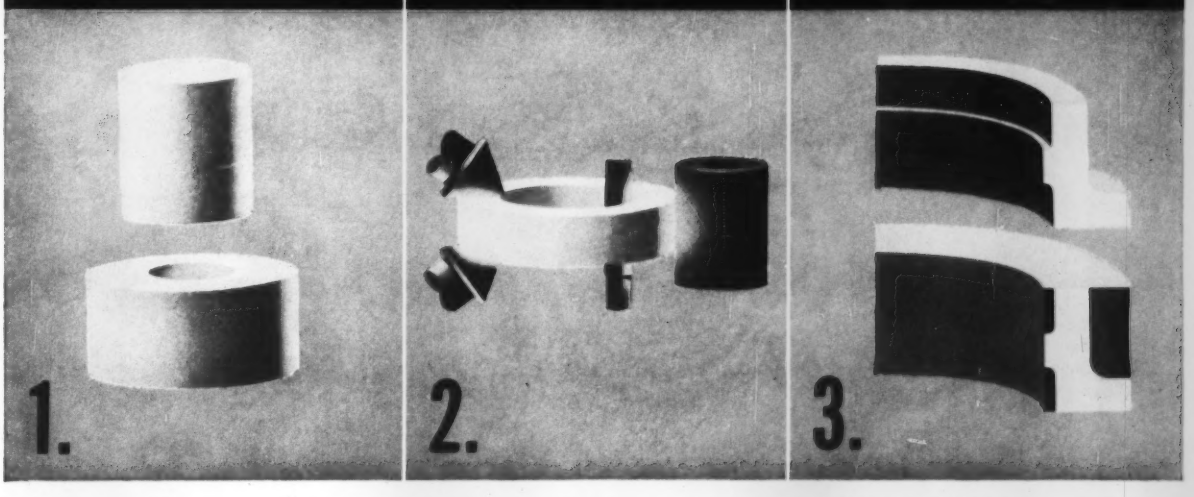
Largest Manufacturers of Resistance Welding Machines in the World

SCIAKY

Sciaky Bros., Inc., 4926 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

Why users get better service from Edgewater

ROLLED STEEL RINGS



1. A solid block of steel sliced from an ingot or rolled bar and heated to forging temperature is upset and punched, forming the "blank."

2. The Ring Rolling Mill enlarges the diameter of the blank, reduces its thickness and forms the ribs, flanges, etc., as required, in one continuous operation.

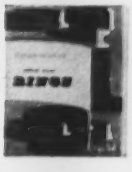
3. Upper view shows accurately shaped section of typical ring, as rolled. Lower view shows material wasted if machined from plain rectangular ring.

FORGING and ROLLING give Edgewater Rings

Maximum strength and toughness with minimum weight

Edgewater Steel Company

P. O. Box 478, Pittsburgh 30, Penna.



WRITE for a 12-page bulletin detailing the Edgewater process for making weldless steel rings.

To help you cut production costs . . .

NEW General Electric

D-c Power Source

KINAMATIC* — — — a new standard in direct-current generators and motor-generator sets—designed to give you higher output at less cost.

As a progressive manufacturer, you are faced with the problem of boosting factory output and beating rising production costs. Where your production process involves adjustable speed, tough duty cycles, frequent reversals or speed matching, you may have already applied the performance advantages of d-c drives. To help you further boost production and reduce your automation costs, completely new sources of constant and adjustable-voltage d-c power are now available—General Electric d-c Kinamatic generators and m-g sets, ¾–100 KW.

More Power Per Dollar—D-c Kinamatic generators pack more power per frame size than any previously designed G-E generator. Nine new kilowatt ratings more closely match both the power requirements of your standard d-c drive motors and the power output of standard prime-moving a-c motors. This new matching gives you a more efficient, more compact adjustable-voltage drive at lower cost.

And a Lot More—A d-c Kinamatic generator or motor-generator set can give you much more than savings on initial automation costs. If you would like to know more about the construction details, advanced performance characteristics and money-saving maintenance features of d-c Kinamatic generators and m-g sets, we would like to have a G-E Apparatus Sales Representative call on you. Or, if you prefer, we will send you copies of GEA-6461 and GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-2

* Trade mark of General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

No More Scaling Here.....
Despite Severe Oxidizing Conditions

A vibrating chute made of a HAYNES high-temperature alloy solved a tough maintenance problem in this heat-treating furnace. The chute spans the entrance to the furnace and is subjected to severe oxidizing conditions. Other chutes became loaded with heavy scale in a few months' time and had to be repaired or replaced. Now that the chute is made of a HAYNES high-temperature alloy, there is no more scale. Parts keep flowing along freely, rejections are way down, and maintenance has been practically eliminated.

There are 11 HAYNES high-temperature alloys. All have excellent strength at elevated temperatures, good creep and stress-rupture properties, and are extremely resistant to oxidizing or reducing atmospheres. One of them may be the answer to a production or maintenance problem in your plant.

For information on prices, sizes, and properties of these alloys, write to our general sales office in Kokomo, Indiana, or to any of the district sales offices listed below.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

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Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

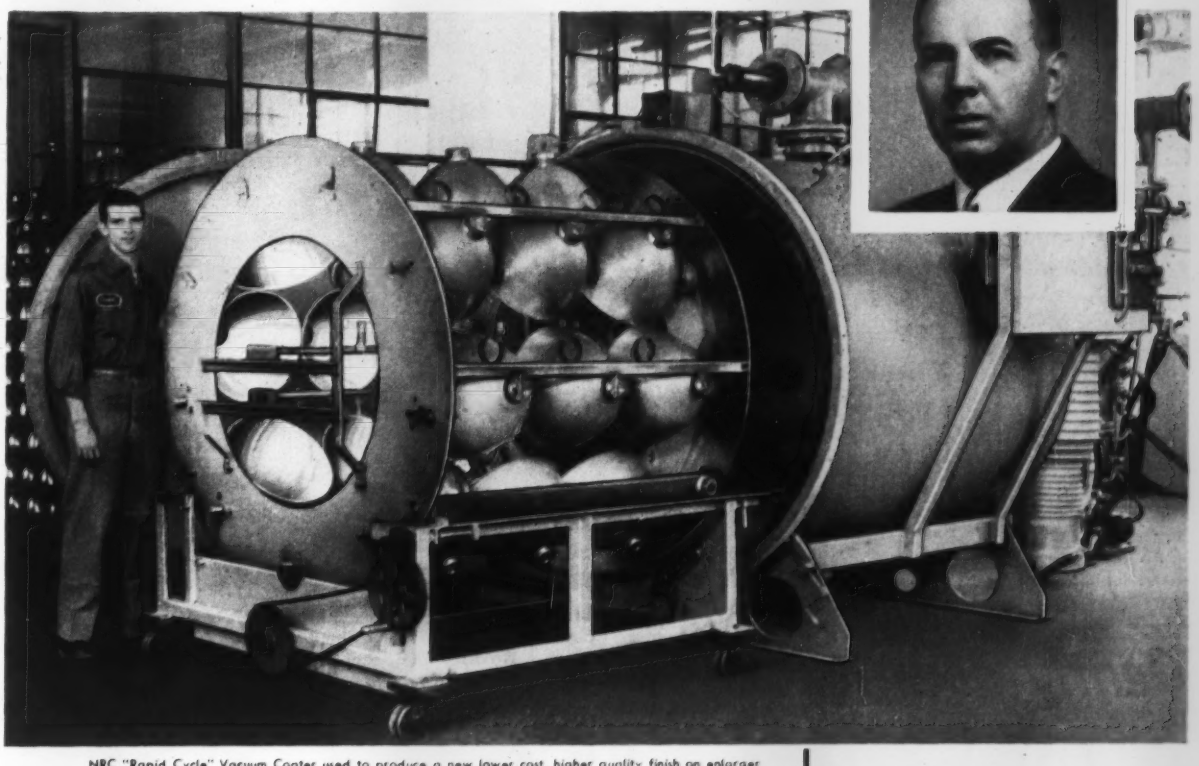
"Haynes" is a registered trade-mark of Union Carbide and Carbon Corporation.

"Our Reflector Finishing Costs Dropped from 4^{00} each to $95^{¢}$ each

WHEN WE CHANGED FROM ELECTRO-PLATING TO VACUUM COATING"

states

Mr. Elwood C. Rogers
President
Elwood Pattern Works, Inc.
125 N. East Street
Indianapolis, Indiana



NRC "Rapid Cycle" Vacuum Coater used to produce a new lower cost, higher quality finish on enlarger reflectors by Elwood Pattern Works, Inc., one of the country's leading photo enlarger manufacturer.

Other comments made by Mr. Rogers about the benefits resulting from his NRC "Rapid Cycle" Vacuum Coater:

"Customers are enthusiastic" . . .

". . . has eliminated all our troubles".

". . . gave us a reflector that would not tarnish or be affected by the heat".

"Our figures show this unit repays its total initial cost in less than 5 months".

You'll find NRC Vacuum Coaters have other important production advantages. They are easier to load . . . safeguarded from operator errors . . . faster to operate . . . less costly to maintain.

We have had years of experience in making and operating vacuum coaters. We can help you on all the problems involved in setting up a vacuum coating production unit — the size of the coater, method of loading, selection of lacquers, type of coating, and many others.

Get all the facts on the lower costs, improved quality possible with vacuum coating. Send coupon below.

We Need
FIVE ENTHUSIASTIC ENGINEERS
To Help Us Keep Growing.

Mechanical, electrical and chemical engineers who honestly enjoy solving novel problems in brand new fields are offered new responsibilities and more stimulating work. Write Mr. David Tobin or call De 2-5800.

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Please send me the "Rapid Cycle" Vacuum Coater Bulletin.
Have your representative call.

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Company.....
Address.....
City.....Zone.....State.....

Cradled in Monel *Gripper Slings*®, thin wall tubing is pickled in five-ton lots without mechanical damage to product. No carry-off or contamination of solution, either.

Gently does it...

Versatile Monel lightens touch of Gripper Slings for thin wall tubing

Broad woven Gripper Slings® like these are a natural for handling thin wall tubing by the ton.

Large contact area supports without crushing and at the same time firms up the grip. Woven wire mesh construction protects against sudden failure, too.

Makes slings of Monel alloy for use in pickling service

For pickling thin wall tubing and similar products, Cambridge Wire Cloth Company normally recommends Gripper Slings fabricated from Monel® nickel-copper alloy wire.

With good reason. First, Monel alloy has outstanding resistance to the common solutions for pickling carbon steel. No need to use *extra* metal as a corrosion allowance. Second, Monel alloy has a very high strength-to-weight ratio. Thus a relatively thin wire may be used with complete safety.

Versatility solves many difficult pickling equipment problems

Monel alloy has proved one of the most useful of all pickling equipment materials. It resists most pickling solutions. It can be drawn, cast, bent, welded, machined readily. It's tough, strong, long-lasting.

For a visual summary of the many pickling uses Monel alloy serves, write for "Equipping the Pickle House for Greater Production at Lower Cost." It's chock full of ideas.

*Registered trademark

The International Nickel Company, Inc.
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INCO TRADE MARK Nickel Alloys

Monel...*for proved pickling life*

STEEL

Metalworking Outlook

December 10, 1956

UAW Will Demand Short Week

The shorter work week will be the major demand of the United Auto Workers in 1958 when contracts with General Motors Corp., Ford Motor Co. and Chrysler Corp. expire. Locals at all three companies have endorsed the action. Not yet spelled out is the form of the demand—whether it will be for a four-day week or a five-day week with shorter hours. Part of the demand, of course, will include the stipulation for pay equal to or greater than present weekly wages.

Pay Hike in '56: 7.5 Cents

The weighted average wage increase for industry in 1956 will be about 7.5 cents per hour, excluding fringe benefits. So says Associated Industries of Cleveland which has just reviewed 287 agreements in northeastern Ohio, often considered to be the barometer for the nation because of its industrial mix. Last year, the average hit 8.5 cents. AIC believes the most significant development of 1956 has been the movement toward long-term contracts. Of the agreements reviewed, 85 are for one year, 156 for two years, 40 for three years, four for five years and one for 66 months. The major fringe benefits: New or improved insurance plans, new or improved pension programs and a seventh (in two cases, an eighth) paid holiday.

Big Three Pay $4.5 Million in SUB

The Big Three auto companies have paid out more than $4.5 million in Supplemental Unemployment Benefits since last June. Laid-off workers received an average of $15.37 weekly from Ford. The average state unemployment benefit in Michigan, also paid to the jobless, is $34 weekly.

Labor Shortage in New England

Rising employment has created a marked shortage of labor in at least two major New England areas—Hartford and Stamford-Norwalk, Conn. It's also plaguing employers in many other parts of the country, says the Labor department. Many big industrial centers report jobs at a record high, and the total's still climbing. Employers in four-fifths of the areas checked say they anticipate job gains into early January.

Rail Spending: $2 Billion Yearly?

Railroads must spend $20 billion in the next decade, declares James M. Symes, president of the Pennsylvania Railroad. The $2-billion-a-year annual rate would be double what railroads spend now. Mr. Symes visualizes 25 million more autos on our highways during the next decade. Such a development will call for 37 million tons of steel, 2 million tons of glass, 1.5 million tons of rubber and 1.5 million tons of aluminum—all of which would involve rail transportation. He estimates railroads can expect 30 to

Technical Outlook—p. 141 Market Outlook—p. 203

35 per cent more business than they have today, "but they must spend money to get it."

Closed-Circuit TV: $75 Million by 1967

Watch for closed-circuit television sales to reach $75 million annually within ten years. Volume now is $6 million a year, says Frank P. Barnes, General Electric Co.'s manager of marketing for industrial television. GE is initiating a nationwide service force trained to install and maintain the company's closed circuit systems. This type TV is carried by cable or microwave from the camera directly to receivers. It is coming into increasing use for surveillance, inspection, teaching, training and data handling.

Vanguard Satellite Tested

Rumors have it that the first test firing of the Vanguard satellite project took place last week at Cocoa, Fla. The Loewy-built launching platform, the blockhouse and other facilities are already in place. Best guess is that the test rocket was a standard Martin Viking. A modification of it will be used to launch the satellite.

U.S. Steel To Boost Pittsburgh Capacity

Another 450,000 tons of plates, structurals forgings and other products (all considered essential to national defense) will be available from a new U.S. Steel Corp. expansion program. About 670,000 ingot tons of capacity is to be added to the corporation's Pittsburgh district plants. Both open hearth and electric furnace capacity will be boosted to bring its distric capacity to 11,910,000 tons. Work on new facilities and improvements will begin early next year.

Where Small Business Won't Work

Can small business participate in all kinds of defense work? No, says Robert T. Ross, assistant secretary of defense. He points out: "The Air Force has 73 aircraft items all costing more than $10,000 each. There is not a single known small business supplier for any of these. There are no known small business sources for nine guided missile items with a unit cost of over $10,000 each. But in small and conventional items, such as vehicles or ammunition, there are many obtainable from small firms." (For more on small business opportunities in defense work, see page 103.)

Straws in the Wind

Don Rarick, chairman of the group protesting the increase in dues by the United Steelworkers, challenges President David McDonald to carry through his threat to try him before a special union board on the ground that his protest is illegal . . . United Auto Workers has added more than 9000 to its rolls in the Philadelphia area as a result of an organizational drive . . . GE may step up capital expenditure plans for the next three years as much as 40 per cent over the $500-million program announced earlier . . . GM's experimental Firebird II has an all-titanium body . . . Du Pont reduced its price on titanium sponge to $2.75 a pound, retroactive to Dec. 3.

He Helps Sell Your Products With **TORRINGTON NEEDLE BEARINGS**

This Torrington Sales Engineer has been discussing a customer's product and how it can be made more salable through the unique advantages of Needle Bearings.

He has told the manufacturer about the features that can be added to his product through the use of Torrington Needle Bearings—such as more compact design, space and weight savings, higher load capacity and less maintenance.

These inherent characteristics of the Torrington Needle Bearing, plus the knowledge and skill of our engineering staff, have made the Needle Bearing "standard equipment" in thousands of products, often improving their salability. May we tell you how the Needle Bearing can help you?

See our new Needle Bearing Catalog in the 1956 Sweet's Product Design File—or write direct for a catalog.

TORRINGTON NEEDLE BEARINGS
Give you these benefits

- low coefficient of starting and running friction
- full complement of rollers
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- low unit cost
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- compactness and light weight
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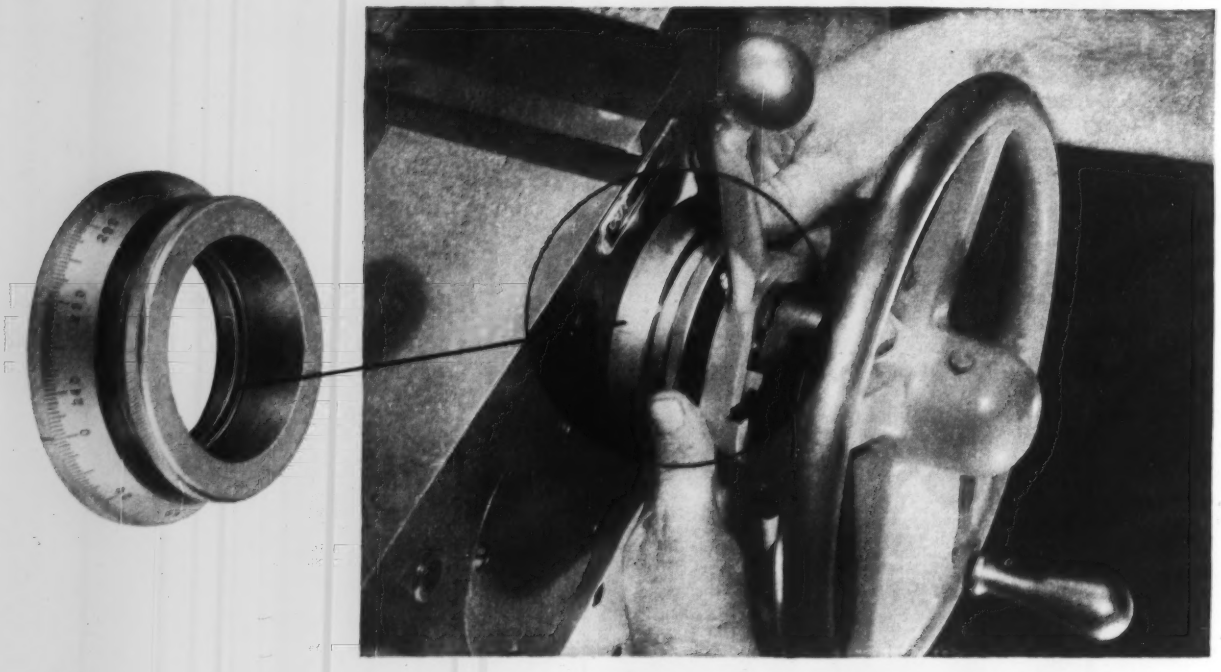

"Armco 17-4 PH Stainless Gives us a Better Product at Lower Cost," Machine Tool Builder says

Serrated dials like this are used on many of the machine tools built by a leading manufacturer. They accurately measure all movements on the tools. So they must be hard, resistant to rust and corrosion, and be finished to extremely close tolerances.

17-4 PH Meets Needs at Less Cost

Armco 17-4 PH Stainless Steel was selected for this critical machine tool part because its unusual combination of high strength, hardness and corrosion resistance meets service requirements and its low temperature heat treatment cuts production costs.

This is what a company official said: "We machine dial blanks from Armco 17-4 PH bars, graduate, then heat treat for hardness (875 F for 1 hour). The part is complete with no further operations and has an excellent appearance. 17-4 PH gives us a better end-product at considerably lower cost."

Results like these are typical of the advantages offered by the unusual properties of this special Armco Stainless Steel. It combines exceptionally high strength and hardness with excellent corrosion resistance and low temperature heat treatment that causes no scaling or distortion.

How About Your Products?

Consider how these advantages of Armco 17-4 PH can improve your products or cut production costs. It is available in the form of bars, wire and billets. A companion grade, Armco 17-7 PH, is supplied in sheets, strip, plates, bars and wire.

For complete information on these special Armco Stainless Steels, fill out and mail the coupon today.

ARMCO STEEL CORPORATION
2636 Curtis Street, Middletown, Ohio

Send me information on ☐ Armco 17-4 PH Stainless Steel
☐ Armco 17-7 PH Stainless Steel
We are considering it for:

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Company_____

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City_____ Zone____ State_____

ARMCO STEEL CORPORATION

2636 Curtis Street, Middletown, Ohio

Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

Competition at Work

During a period of record growth and prosperity, we often are inclined to overlook competitive factors that can spell failure or success.

Take manufacturing capacity. It's 50 per cent above prewar levels (measured by its current depreciated value). Nearly 75 per cent of the $115 billion invested in new plants and equipment from 1929 through 1955 has been spent since the war. Man-hours per unit of production are only three-fifths of the 1929 figure.

This phenomenal change raises a question: Can the market absorb all the goods industry can produce? If it cannot, highly automated plants face the problem of operating at capacity to hold down unit costs. Operations at partial capacity could lead to cut-throat competition.

Adding to the competitive confusion is the continuous parade of new manufacturing techniques which accelerate the obsolescence of equipment. Replacement calls for capital expenditures which may add to the cost of the end product.

A fourth factor puts the dilemma into focus: As our population grows, manufacturing capacity far beyond what we have today will be needed. Yet the growing squeeze on money is gradually dampening the incentive to plan and build plants today that will be needed for tomorrow's markets.

Markets are changing, too, as family incomes are upgraded by the continuing wage spiral. People want better products of improved design and appearance, but prices must be attractive.

Because of wage-price inflation, the economy cannot stay on dead center. The outlook still is for long-term growth and prosperity.

In the meantime, industry must square up to the test of passing along higher labor and material costs in the form of higher prices. Of course, the market is mildly resistant. That's the challenge.

No doubt about it, we are in a period when we need to watch the significant competitive influences which affect our business.

Irwin H. Such
EDITOR-IN-CHIEF

VALLEY MOULD AND IRON CORP.

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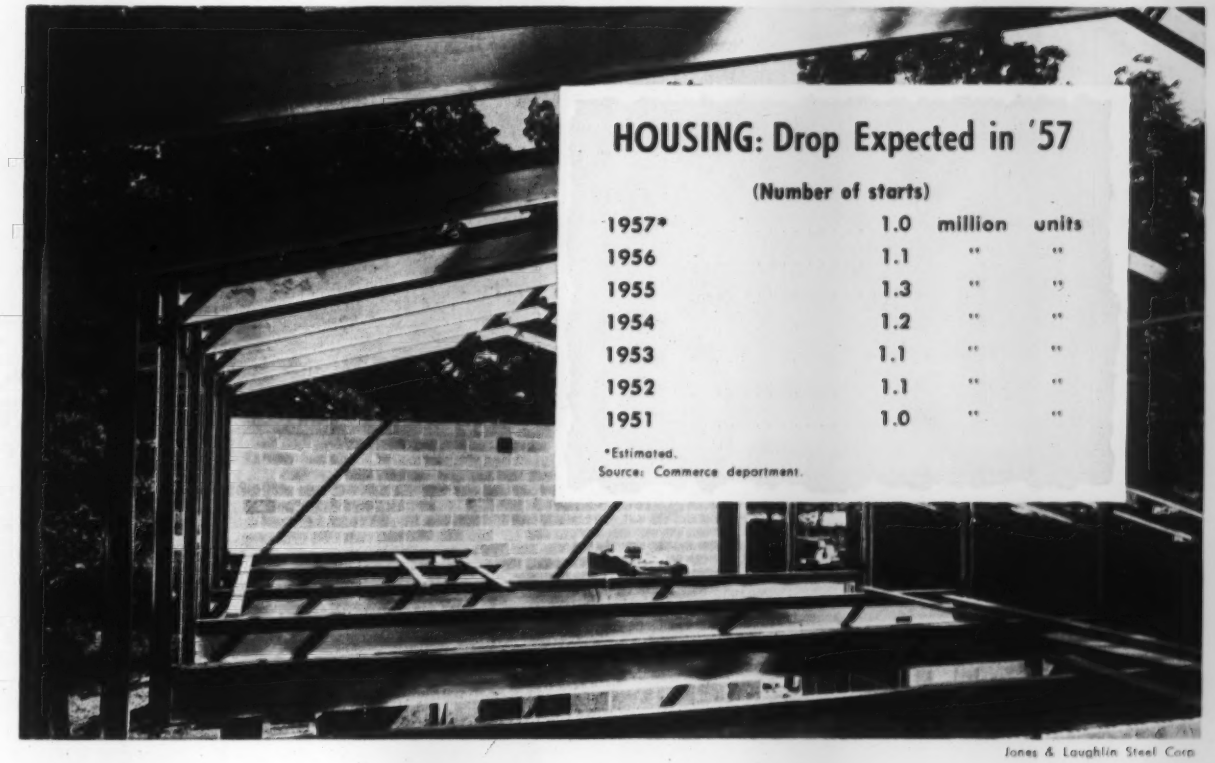


HOUSING: Drop Expected in '57

(Number of starts)

1957*	1.0	million	units
1956	1.1	"	"
1955	1.3	"	"
1954	1.2	"	"
1953	1.1	"	"
1952	1.1	"	"
1951	1.0	"	"

*Estimated.
Source: Commerce department.

Jones & Laughlin Steel Corp.

Ceiling on Housing Starts

The industry will probably do well to build 1 million in 1957 because of the tight money situation. That could mean a drop of some $350 million in metalworking sales next year

HOUSING, that segment of the booming construction industry which stubbed its toe this year, will find even tougher going in 1957.

Most optimistic outlook: 1.1 million units will be built next year—about the same number is expected this year. But most people in the industry are forecasting that starts next year will be down to 1 million units or less.

Loss—For metalworking, which has an estimated $3 billion or more stake in the housing market, the predicted drop could mean a sales loss of $300 million to $350 million—and this figure includes only home components, such as bath and kitchen fixtures and plumbing, heating systems, electric fixtures and wiring, and metal windows.

Additional impact will be reflected in the major appliance industry which depends upon the home builders' market for some 15 to 20 per cent of its sales. Some products go even higher—Rheem Mfg. Co. estimates that better than 33 per cent of its hot water tanks go into new homes. (For a round-up on major appliances, see STEEL next week, Dec. 17.)

Silver Lining — Percentagewise, metalworking's sales drop may be less than the decrease in the number of homes built—there's more metal going into home construction (STEEL, May 11, 1955, p. 64). Biggest gains have been in the use of metal window frames. In 1955, an estimated 15 per cent of the new homes were built with steel window construction, 25 per cent with aluminum. Another big gainer: Metal kitchen cabinets.

New home construction in the first nine months of 1956 totaled 879,300 units, off better than 16 per cent from that of the same period in '55 (see chart). Blamed for the situation is the tight money market.

Artificial—George E. Price, president of National Homes Corp.—the nation's leading prefab home builder—states that the decline in housing starts has no real relation to the normal pressures of supply and demand. For proof, he points out that the number of new homes financed by conventional mortgages carrying 5½ and 6 per cent interest rates has declined only 3.6 per cent from last year's mark, compared with a 31 per cent

drop in FHA-VA construction.

On Dec. 4, the Federal Housing Administration moved to boost the FHA interest rate from 4½ to 5 per cent. That will help, but not too much. But the Veterans Administration rate (4½ per cent) must remain at that unrealistically low level until Congress changes it. Assuming that the legislators act sometime next year, there still will be a lag before it becomes effective. So any increase in the VA interest charge will probably come too late to spur home building significantly in 1957. Uninsured loans are going at 5½ per cent and higher. To go above 5 per cent, FHA needs Congress' O.K.

Prefab Troubles — One of the hardest hit groups is the prefab home industry. National Homes expects to sell less than 17,000 units this year, compared with 22,800 last year. When the government cut down payment requirements (from 7 to 5 per cent) for FHA homes costing less than $9000 in September, National Homes introduced a line of homes designed for that market. It's also setting up more dealerships to boost sales.

Prefabbers say they're gaining a bigger share of the housing market. In the FHA-VA market, their primary target, prefab volume is down only 22 per cent, compared with the total decrease in all FHA-VA housing of 31 per cent.

Tool Distributors Strong

Tight money has had little effect on new machine tool orders placed with distributors, says Joseph F. Owens Jr., president, American Machine Tool Distributors' Association. Backlogs at the end of the year, and total shipments of machine tools through distributors in 1956 will exceed 1955's.

Forecast for 1957: "Total shipments will at least maintain 1956's level, and might increase 5 to 25 per cent in some regions."

Gypsum Builds Two Plants

A $19-million expansion program for the Great Lakes area has been started by National Gypsum Co., Buffalo.

Plants will be built at Waukegan, Ill., and Lorain, O.

Tight Money To Stay

Economists and businessmen do not look at the situation the same way. Some economists feel that investment needs must be met by a higher rate of national savings

MONEY will be tighter in 1957 than it is now, says a group of economists meeting under the auspices of the National Industrial Conference Board, New York.

In fact, 3 of the 16 experts polled think money isn't tight enough. One says it is too tight. A slight decrease in demand for capital in the second quarter may cause some relaxation in the money market during that period, but it won't be felt too much. Over the year the second half promises to be easier than the first half, but again the situation will be spotty.

Inflation—The group agrees that credit extension in 1956 has been particularly liberal. Over the long run, they feel investment requirements must be met by a higher rate of national savings if we are to hold back inflationary pressures.

Among the participating economists: George P. Hitchings, manager, economic analysis department, Ford Motor Co., and Bradford B. Smith, economist for U.S. Steel Corp.

No Money—Bank credit came in for special attention. "Banks are reaching a point where they can't supply the amount of funds necessary," notes George S. Eccles, president, First Security Corp. and First Security Bank of Utah. He believes banks will be restricted to current-type loans in the future, rather than capital loans.

Says Aubrey G. Lanston, president, Aubrey G. Lanston & Co. Inc.: "It looks as though banks may have to further increase the proportion of risk assets to total liabilities." He says that if commercial banks could offer higher interest rates, more money would be transferred to them from other investments.

Growing—Ford's Mr. Hitchings went on record that business activity has not been held back unduly by the Federal Reserve's tight money policies. "In the past year, we have come through a period of hesitation, but not primarily because of the tight money policy."

Added U.S. Steel's Mr. Smith: "Money is not too tight because we still have rising prices. We still have basic inflation in the wage structure and other costs. We still have full employment."

Martin R. Gainsbrugh, chief economist, NICB, summarized the group's findings: "Continuation of present money conditions might contribute toward a recession, but a recession won't originate from it." On the national level, the economists stressed: 1. The need to re-examine the tax structure in terms of its impact on savings, earnings, interest and dividends. 2. The need to encourage a higher rate of savings.

Servo Adds to Assembly Plant

Construction of an addition to the assembly plant of Servo Corp. of America, New Hyde Park, L.I., N.Y., features dust-free design.

The area used for the assembling and testing of precision electromechanical products will be increased by 50 per cent. Work is under way.

Soundscriber Gets New Plant

Soundscriber Corp. has started construction of a 55,000 sq-ft office and manufacturing headquarters at North Haven, Conn. The $750,000 plant will be finished by April. It'll have 25 per cent more space than the company's present leased quarters.

ODM Gives Tax Aid

Certificates for the fast write-off of taxes in the two weeks ended Nov. 14 totaled almost $88 million. The Office of Defense Mobilization says $38,335,500 of the projects are for petroleum refining facilities.

The largest amount certified was $31,966,500 for Commerce Oil Refining Corp., Portsmouth, R. I.

Edgar F. Kaiser sees expansion, good business in . . .

Report on Kaiser Industries

A FOURTH blast furnace will be built at Kaiser Steel Corp.'s Fontana, Calif., plant if the company can borrow $81 million for the project.

Edgar F. Kaiser, president of Kaiser Industries Corp., doesn't doubt that the money will be raised. "We should be able to repay the loan in seven years," he says.

In the Works — Kaiser has a $113-million expansion program which is nearing completion.

The firm is installing oxygen converters in the Fontana furnaces. Present mill capacity is 1.5 million tons. Current expansion will increase this to 2.2 million, and the additional blast furnace will raise annual capacity to just about 3 million tons, reports Mr. Kaiser.

Design and engineering work on the furnace are completed. Construction will start as soon as funds are available. The additional capacity will be used to expand the output of large diameter pipe. Mr. Kaiser says the company has no plans to boost rolling mill capacity until at least 1965.

Booked Ahead — Referring to Kaiser Industries generally, Mr. Kaiser reveals the steel plants are booked at full capacity through 1960. "Only regular customers can place additional orders for pipe and plates," he says.

"Aluminum demand is about equal with supply. Tin plate and cement output also are booked through 1960."

Going contrary to industry rumors, Mr. Kaiser reports: "I don't think steel prices will go up (after the first of the year). We aren't planning to raise our steel prices, but if a general price increase comes, we can't sit back and do nothing."

Steel Expands

Increases in ingot capacity in the U.S. and pipe production in Canada highlight this week's expansion news.

U.S. Steel—Improvement of facilities will add over 1.3 million ingot tons of capacity to the Chicago district plants of U.S. Steel Corp., Pittsburgh. When first announced by its chairman, Roger M. Blough (STEEL Mar. 19, p. 46), the expansion was set at 1.2 million ingot tons.

Canada — Page-Hersey Tubes Ltd., Toronto, Ont., will build its second mill for the production of electric-resistance welded steel pipe at Welland, Ont. The new mill (estimated cost, $5 million) will produce pipe with outside diameters of 2⅜ to 8⅝-in. Production is expected to start in 1958.

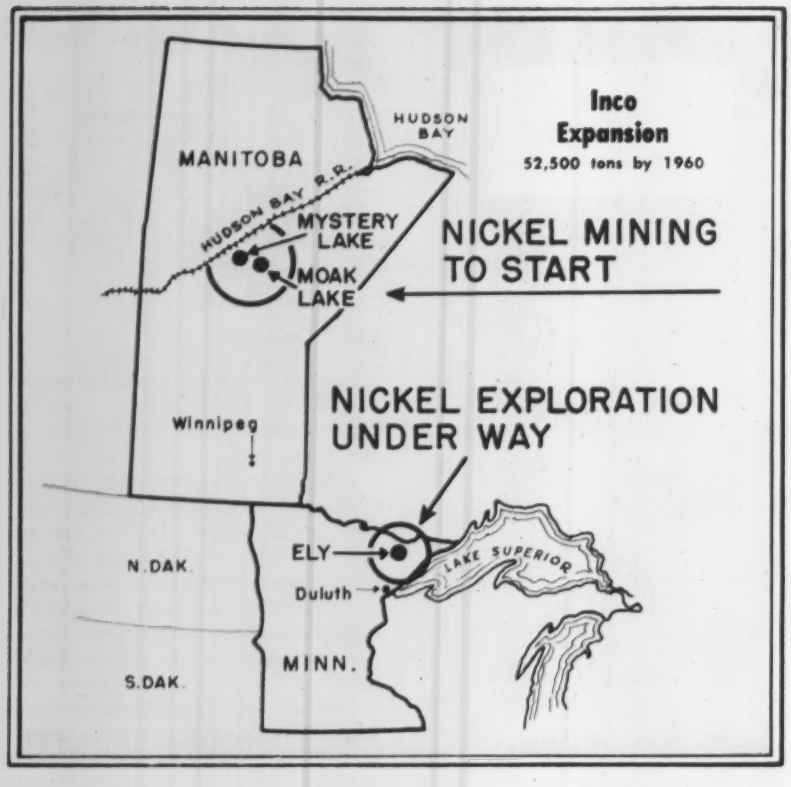
Headquarters—Mannesmann International Corp. Ltd., a German producer of seamless steel pipe, will establish a Canadian branch with headquarters in Toronto, Ont. Its initial capitalization will be $30 million.

The Toronto branch will administer and finance pipe-producing facilities throughout North America.

The German firm has a subsidiary, Mannesmann Tube Co. Ltd., at Sault Ste. Marie, Ont., where a $20-million pipe mill is nearing completion.

Coming — The chairman of the metropolitan development commission of Vancouver, B.C., James S. Eckman, says news about construction of a major steel mill in that city "should be breaking soon."

He states the steel mill "will probably be built by German or Japanese interests, with Canadian participation." He also says there are plans for a custom smelter which will refine and smelt copper, lead, zinc and silver concentrates from British Columbian mines.



Inco Develops New Mines

International Nickel Co. of Canada will move heavy construction equipment over the ice by tractor train to get an early start on two new nickel mines next spring

IN 1960 International Nickel Co. of Canada Ltd. will increase its nickel production from about 140,000 to 192,500 tons annually.

Two new mines in the Mystery-Moak Lakes region of northern Manitoba (Thompson and Moak mines) and some production increase from the nickel ore body in the Sudbury district of northern Ontario will account for the jump.

Cost—Inco will spend $175 million to develop Mystery-Moak (it's 75 to 80 miles long, averages 5 miles in width). It will become the second largest nickel producing operation in the world. Sudbury ranks first.

To deal with higher costs and facilitate maximum production, Inco has increased the price of refined nickel by 9.5 cents, effective Dec. 6. That brings the export price of electrolytic refined nickel from the Port Colborne, Ont., refinery to 74 cents a pound, including U.S. import duty of 1.25 cents.

Inco's decision to develop Mystery-Moak now means a year's gain on its new production. If the firm had waited another month, heavy construction equipment could not have been moved into the area because of winter conditions. Now construction can start in the early spring.

Politics—Henry S. Wingate, Inco's president, says the company has submitted a proposal to the Office of Defense Mobilization which outlines how additional supplies of nickel, at the market price, might be supplied to the U.S.

Washington has not accepted the proposal, but if it enters into contracts for new nickel production in Cuba, Inco will be given consideration, and probably the right to deliver some portion of its new Canadian production to the U.S. stockpile.

Mr. Wingate estimates that world nickel capacity will be between 300,000 and 317,500 tons in 1960. Last year's Free World total was 213,500 tons. This year's should be about the same.

Finances—Inco will finance the initial cost of developing Mystery-Moak with its own funds. It anticipates that it will be reimbursed for the construction of the power plant and railway spur. The capital outlay will be around $115 million, and will include the cost of opening and developing two mines, a concentrator, smelter, refinery and transportation facilities, plus town site installations.

Comments Mr. Wingate: "It is too early to make a definite estimate of the final ore possibilities, but sufficient ore has already been found to justify the money we are spending."

Fringe Benefits Up

Advance payment of salary is the fastest growing fringe benefit being received by the nation's clerical office workers.

The 1956 survey of office fringe benefits by the National Office Management Association, Philadelphia, shows that 59 per cent of 5000 companies surveyed grant advance pay. In 1948, the figure was only 25 per cent.

Cash Payments—The number of firms granting pay for voluntary severances has almost doubled—from 9 per cent in 1948 to 17 per cent this year. In 1948, 49 per cent granted involuntary severance pay. The latest figure is 63 per cent.

Employees get cash awards for suggestions in 26 per cent of the businesses surveyed, compared with 17 per cent in 1948.

Insurance Benefits — Pension plans show the largest gain among the insurance type of fringe benefits. Sixty-six per cent of the firms surveyed now have pension plans, while only 53 per cent did in 1948. Group life insurance plans are in 84 per cent of the offices.

Big Pay-Off

Rate for supervisors usually is constant within multiplant operations, an AMA study shows

HOW does your rate of compensation for supervisors stack up with what others are paying? You can get a pretty good idea from a 100-company survey which was done by Dean H. Rosensteel, director of the American Management Association's executive compensation service.

Geography—There is less of a geographical differential than most executives realize. About 65 per cent of the companies with multiplant operations report no pay differentials because of geographic location. Only slightly higher pay rates were found in metropolitan areas, such as New York, Detroit and Chicago. California has slightly higher scales; some smaller communities and southern states had slightly lower than average rates.

Highlights—1. Thirty-nine per cent of the companies have incentive or bonus systems for supervisors. But, only 5.5 per cent have a special incentive system for supervisors exclusively.

2. Three-fourths of all companies establish supervisory pay scales by job evaluation—45 per cent of these by a formal point system and 40 per cent through an informal, subjective ranking method.

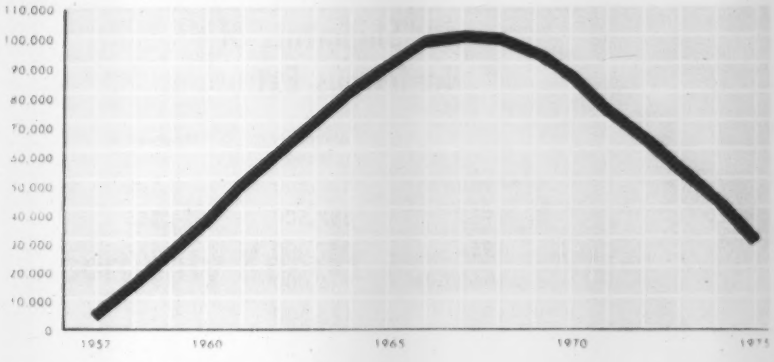
3. Seventy-five per cent grant general wage increases. Of this number, one-third make flat rate increases and two-thirds grant percentage increases. There is a trend away from general to strict merit increases.

4. Fifty per cent have a policy of increasing supervisory pay scales 5 per cent. The other half are about evenly distributed, with increases ranging from 5 to 10 per cent.

Skinner Chuck Enlarges

Building additions at Skinner Chuck Co., New Britain, Conn., will increase production and storage space by 20,000 sq ft and enlarge the engineering department by 6500 sq ft.

The Shortage of Engineers and Scientists: How It Will Grow Until 1968



Source: B. F. Goodrich Co.

Survey Shows Needs

We'll need twice the number of engineers and scientists we have now by 1975. Next ten years are critical. During that period, we must encourage more students to enter sciences

IF WE don't persuade more college freshmen to major in engineering and the sciences, our supply of scientific manpower will be running 100,000 short of our needs by 1967. (Assuming supply and demand are now in balance.)

After that (see chart), the increased birth rate of the postwar years will start to make up the deficit.

The figures come from B. F. Goodrich Co., and the projection over the next 20 years is based on the present rate of scientific graduates (186 per 1000 students earning first college degrees).

Solution — We can avoid the shortage by boosting our rate of science grads to 205-215 per 1000 college grads for the next ten years, says the company. After 1967, we can allow the rate to drop a little without much danger because the increased college population probably will hold up the supply of scientists.

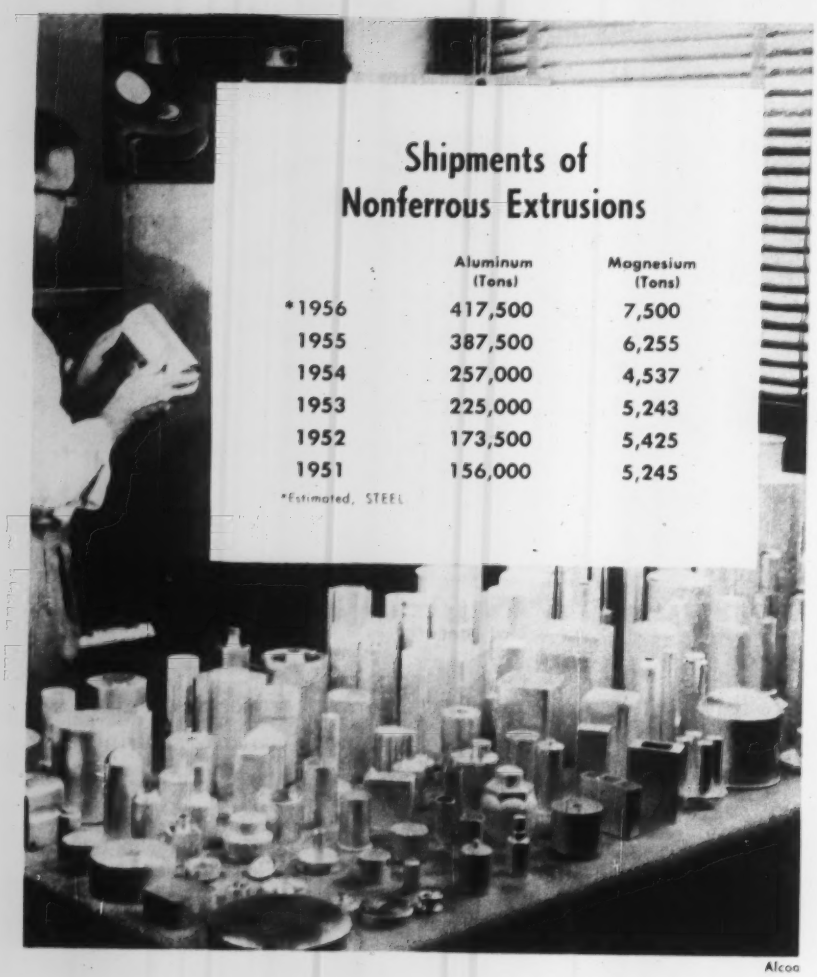
Another means of solving our immediate shortage: Get more high school graduates to enter college. Notes Goodrich: "Approximately one-half of the top one-fifth of our high school graduates do not enter college."

If we don't get more students into the sciences, Goodrich estimates it will take us 10 to 15 years after 1967 to make up for the 100,000 deficit.

Slump—We now have about 950,000 scientists and engineers. We were producing new ones at a rate of 250 per 1000 college grads in 1950. Then the rate dropped: In 1951, it was 231; 1952, 205; 1953, 189; 1954, 182; 1955, 186. Why the rate fell so fast is a mystery.

In raw figures, the decline does not bode well for the scientific development of the country: 109,270 engineers and scientists were graduated in 1950, 53,359 were graduated in 1955.

Background — The Goodrich study provides some interesting gages to our economic growth and its relation to scientific manpower. From 1930 to 1956, the number of scientists and engineers per 10,000 population has grown from 21 to 57; per 10,000 employed, from 57 to 148; per $10 million of gross national product, from 16 to 24; per point of the Industrial Production Index, from 530 to 660.



Shipments of Nonferrous Extrusions

	Aluminum (Tons)	Magnesium (Tons)
*1956	417,500	7,500
1955	387,500	6,255
1954	257,000	4,537
1953	225,000	5,243
1952	173,500	5,425
1951	156,000	5,245

*Estimated, STEEL

Alcoa

More Nonferrous Extrusions

Titanium shapes will show the biggest gains next year, but output of aluminum, copper and magnesium products will be at least 10 per cent better than it was in 1956

SHIPMENTS of nonferrous extrusions will hit new peaks in 1957. The achievement will be the more remarkable because 1956 was a record year (see the table).

Titanium will show the greatest gains. It will be followed by magnesium, aluminum and copper and copper-base extrusions. The general increase in 1957 over 1956 will range up to 10 per cent.

Aluminum — An Aluminum Co. of America index shows capacity to turn out aluminum extrusions is 40 per cent greater now than in 1953. It will increase another 10 per cent in 1957, to put the potential 50 per cent higher than it was four years earlier. Nearly 25 per cent of primary aluminum output goes into shapes formed by some 150 firms that use the extrusion process.

Says G. A. Waterman, product manager for Kaiser Aluminum & Chemical Sales Inc's extrusion division: "Aluminum extrusions are one of the fastest growing types of aluminum mill products. Improved alloys, better production and testing techniques, which make possible shapes larger in cross section, are contributing factors. Kaiser expects to double sales of light extrusions in 1957, with larger capacity in its Halethorpe, Md., plant and at its Dolton, Ill., facility which it acquired in October.

Reynolds Metals Co. points out that the development of anodic finishes which can be colored also has been a boon to extrusions, especially for auto parts. The four leading uses of extruded aluminum are in building construction, aircraft, other transportation and irrigation pipe.

Some of the newer applications: Auto bumpers, radio parts, highway signs, radio parts and guided missile parts.

Copper—The volume of copper and copper-base extrusions is up nearly 10 per cent this year over 1955's. Look for another increase next year. Capacity to extrude copper and its alloys is expanding more rapidly than that for casting and rolling. A greater potential for copper-base extrusions looms as newer and more complex alloys become practical. An example: The unusual combination of good hot-working and free-machining properties of tellerium copper alloys is resulting in their increasing use for extruded shapes.

With large, powerful presses available at brass mills, more designers are re-evaluating the possibility of using extrusions for parts previously cast or rolled. There is also a growing trend toward the use of longer mill lengths for feeding turret lathes and screw machines.

One unusual application is the I-shaped mullion for the Seagram Tower in New York. Commercial production of architectural bronze extrusions has been limited to a die diameter of 6 in. By using dies of special design, mullions now can be extruded in 26-ft lengths with a cross section of about 7 in. between extremes. The die diameter is 10 to 12 in.

Magnesium—Look for the use of magnesium extrusions to expand at a rate of at least 20 per cent yearly. The largest single market is extruded anodes for protection of hot water heaters, says Dow Chemical Co. The second most important market is in consumer

goods—luggage, ladders. Those two account for the consumption of more than 50 per cent of all primary magnesium.) The third most important consumer is the aircraft and missile group. Magnesium extrusions also go into hand tools, truck bodies, oil field equipment, auto parts, radar console cases and dock boards, to name just a few.

Wider applications in the aircraft and missile field are likely because of the development of high-temperature alloys, the perfection of the pellet extrusion process and the impending operation of Dow's new 13,200 - ton press at Madison, Ill. This plant annually turns out more than 300,000 lb of forms extruded from pellets.

Titanium — First production shipments of titanium extrusions were made this year—they will reach 75,000 to 125,000 lb. (For more on subject, see page 142). Look for production in 1957 to be three to five times greater.

Now and in the near future, most titanium extrusions will go into aircraft. The most extensive use will be as shroud rings in advanced jet engines and airframe structural members. But an increasing quantity of extruded and redrawn tubing will be used by the chemical industry next year. Development work will be mostly in die design and lubricants to improve surfaces and provide more complex sections.

These companies are among firms which have extruded titanium or are contemplating it: Titanium Metals Corp. of America, Harvey Machine Co., Chase Brass & Copper Co., Babcock & Wilcox Co., Bridgeport Brass Co., Curtiss-Wright Corp.'s Metals Processing Division and Reynolds Metals.

Says Ward W. Winkler, TMCA's assistant manager for market development: "The elimination of finishing operations and reduction of waste guarantee a growing market for titanium extrusions. Present users will increase their applications as capacity and manufacturing know-how increase."

Builds Malleable Foundry

Pennsylvania Malleable Iron Corp., Lancaster, Pa., has started construction on a $600,000 foundry at Landisville, Pa. A 100 x 350-ft structure is being built on a 21-acre site.

The plant will consist of a foundry, cleaning and sorting rooms, and annealing and shipping departments. It's expected to be in full operation by Apr. 1, 1957, with 125 men on the payroll.

Operations of the company's malleable foundry and hardware division in Lancaster will continue.

Opportunity Knocks

SBA encourages prime contractors to subcontract to small firms. Meetings point up defense needs

DESPITE the growing complexity of weapons (atomics, missiles and electronics), the nation's small business corps can continue to get close to one-third of all U.S. defense procurement dollars, says Robert T. Ross, assistant secretary of defense.

In fiscal 1956, small firms obtained $3.5 billion worth of prime defense contracts. Add another $1.5 billion to include work done by small businesses as subcontractors. Defense awarded almost $18 billion in contracts in fiscal 1956; with the Suez crisis, look for greater expenditures in fiscal 1957.

Pot of Gold—Wendell B. Barnes, head of the Small Business Administration, figures small firms could have obtained $5.5 billion in prime contracts in fiscal '56, instead of $3.5 billion, if they had wanted or had known about the business.

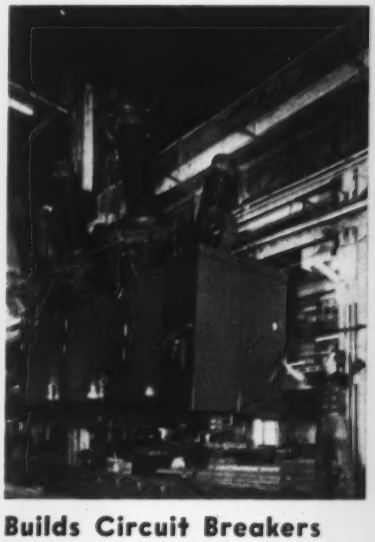
Telling small businesses about this pot of gold is the goal of SBA's current series of Opportunity Conferences. About 600 small firms (employing under 500 persons) sent representatives to the Cleveland conference last week.

Prime Source — They learned that big prime contractors like General Electric Co., Thompson Products Inc., General Motors Corp. and North American Aviation Inc. were anxious to secure their services as subcontractors.

SBA spokesman Curtis Anderson noted that after previous conferences government buying offices and large prime contractors were always beseiged with inquiries.

Advice—Defense isn't the only source for government business. More than 65 per cent of all civilian government orders went to small companies in fiscal 1956, says C. D. Bean, commissioner of Federal Supply Service, General Services Administration. Those orders were valued at $555 million.

The Opportunity Conferences are sponsored by local chambers of commerce. Check your chamber for information on when the meetings will be held in your area.



Builds Circuit Breakers

Westinghouse Electric Corp. is building 22 of these dead-tank, compressed air circuit breakers for Consolidated Edison Co. of New York. The 138-kv outdoor units have a normal current rating of 1600 amperes and an interrupting rating of 10 million kva

Small Business Benefits

Small business's share of government buying was 22.2 per cent during the last three fiscal years, compared with 19.4 per cent in the previous three, says Small Business Administrator Wendell B. Barnes. Small business also boosted its share of defense contracts in the three-year period: From 18 per cent to 21.8 per cent. In fiscal 1954, the Department of Defense awarded $2.9-billion worth of net prime contracts to small firms; in 1955, $3.2 billion; in 1956, $3.5 billion.

Mr. Barnes reports that SBA set aside $1.25-billion worth of government purchases for exclusive award to small firms from Aug. 1, 1953, through Sept. 30, 1956.

Government Stockpiles To Continue Declining

THE TREND to cut purchases of raw materials for the national stockpile is clearly marked: In fiscal 1954 such spending hit $1045 million; in 1955, it dipped to $944 million; in 1956 to $713 million. Estimates for fiscal 1957 put the cost at $378 million. The amounts of materials purchased will slip even faster than total spending; as the stockpiles grew, so did the costs of keeping them up. Look for continued deferrals of tight supply items like nickel and aluminum to industry. Already announced: Diversions of aluminum to industry through the first half of 1957; nickel will be diverted through the first quarter.

More Diversion of Nickel to Industry?

A close watch is being kept on the nickel situation in particular. After the diversion was announced, there was a strong feeling that the lid would be put back on after the first quarter. But such talk has lessened in recent weeks: Now some sources will tell you the diversion will continue as long as the present tight supply continues. Where stockpile goals are almost full (lead and zinc), the outlook is for more buying where necessary to maintain a strong domestic industry. Materials in that category might not be bought directly for the strategic stockpile, but purchases could be made under the Defense Production Act.

Decision on Government Tankers

Watch for two government decisions on tankers within a month. The questions to be resolved: Should the government build tankers? Where will the steel come from? The answer to the first will come largely from a report being prepared by the National Petroleum Council which will list tanker building plans of private firms between now and 1960. Then, because most tankers now planned for commercial firms are based on sharply rising world consumption, the government will have to decide how many more, if any, are needed for national security.

Tankers Seen as Direct Defense Items

With an eye on the steel shortage, the Defense Mobilization Board is discussing the possibility of classifying tankers as direct defense items to make them eligible for material allocations under the defense materials system. Defense planners say it will be another week before they'll make a decision on such a move. But a Maritime Administration official already has said such action is inevitable.

FHA Action Questioned

The raising of interest rates on FHA insured loans is getting a mixed reaction. Persons in the housing industry generally feel that it will be of some benefit by attracting more mortgage money. But an AFL-CIO spokesman "speaking" for prospective home buyers charged that new rates are a blow that will price some families out of the housing market.

Defining Small Business

The government's new definition of small business (for use in procurement programs) goes like this: If a business is dominant in its field, it cannot be called small even if it has less than 500 employees. A business in a field characterized by large firms may be classed as small, even if it has more than 500 employees. The old definition had an inflexible 500-employee rule as the dividing line.

To Look at Automation

The Joint Economic Committee's subcommittee on economic stabilization is taking another look at automation. It will review developments that have followed extended hearings of a year ago. The upcoming hearings will cover several aspects of automation in more detail, especially instrumentation and automatic control.

Highway Safety Pushed

The Commerce department is setting up a two-year study of highway safety. Some items to be covered: The effect of speed and horsepower on accidents; the chances of putting more pressure on auto makers to build more safety into cars.

Straw in the Wind

• Defense department's military traffic management agency, which will handle all commercial freight and passenger shipments for the military, will be in full operation by next June 30.

Morgan Quality in Action

MORGAN WORCESTER

High Speed Four Strand Rod Mill

Cuyahoga Works, American Steel and Wire Division

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Morgan Mills are known to steel men throughout the world for their sound design and accurate manufacture . . . an enviable reputation which has assured mill users of efficient and trouble-free operation. Morgan Mills have kept pace with the ever-increasing demands for high output and greater accuracy of product.

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Bearings, Inc.

the foundryman's friend...through service!

Dirt . . . the most feared enemy of any good anti-friction bearing was damaging many bearings in the maintenance stock at the Taylor and Boggis Foundry Division of The Consolidated Iron-Steel Mfg. Co. of Cleveland, Ohio. John Cunin, Bearings, Inc. salesman, was called and within a short time, under the direction of the Taylor and Boggis Maintenance Superintendent reorganized their maintenance stocks of bearings and developed a more practical record keeping system.

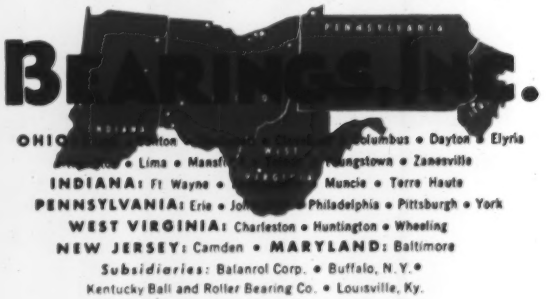
First—all bearings in stock long enough to be affected by foundry dust were taken to Bearings, Inc. There, they were thoroughly cleaned, rewrapped and repackaged to be as dustproof as possible.

Second—all bearings in use in the foundry were identified by the Bearings, Inc. salesman according to the bearing manufacturers' numbers. By converting the equipment manufacturers' parts numbers to standard bearing numbers, many bearings purchased from various sources under a variety of parts numbers were found to be identical.

Weeding out these duplicates greatly reduced Taylor and Boggis purchases for inventory. Bearings, Inc. now knows what bearings the foundry uses and makes certain stocks for any emergency are carried at our branch. Taylor and Boggis now installs only factory-fresh bearings from inventory or orders from Bearings, Inc. and receives the bearings they need immediately.

Need this kind of service—service with a capital "S"? Just call our nearest branch—no obligation, of course.

Rendering bearing service in the territories adjacent to our branches, listed below.


PENNSYLVANIA
OHIO: Columbus • Dayton • Elyria
Lima • Youngstown • Zanesville
INDIANA: Ft Wayne • Muncie • Terre Haute
PENNSYLVANIA: Erie • Philadelphia • Pittsburgh • York
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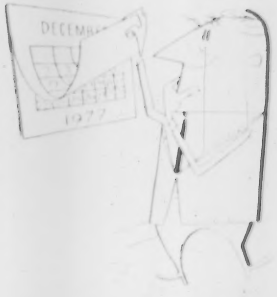


U. S. Steel's Bay Estes Looks at 1977

WHAT'S the business outlook for 1957, 1967 and 1977? When U.S. Steel Corp. executives want to know, they ask Bay E. Estes. As director of the Pittsburgh corporation's Commercial Research Division, he leads a group of 60 fact finders who help guide corporate policy with their answers to tough questions.

Looking 20 years ahead is only part of Mr. Estes' job. "We balance past and present markets for steel against countless variables to make short and long-term studies," he explains. "Developing conclusions from these studies is our most important task."

History — Commercial Research was established in 1938, before the corporate structure assumed its present shape. Mr. Estes joined the group in 1939 and was named its director in 1948. Now the group is part of U.S. Steel's central marketing organization which co-ordinates sales of the entire corporation.

Information on sales and potential markets flows to Mr. Estes' group from sales offices and commercial researchers throughout the corporation. "We start with these 'knowns' and dig out all other available facts," adds Mr. Estes. "We evaluate our findings, taking the buyers' or sellers' psychology into consideration, as well as our capacity to produce what buyers will want."

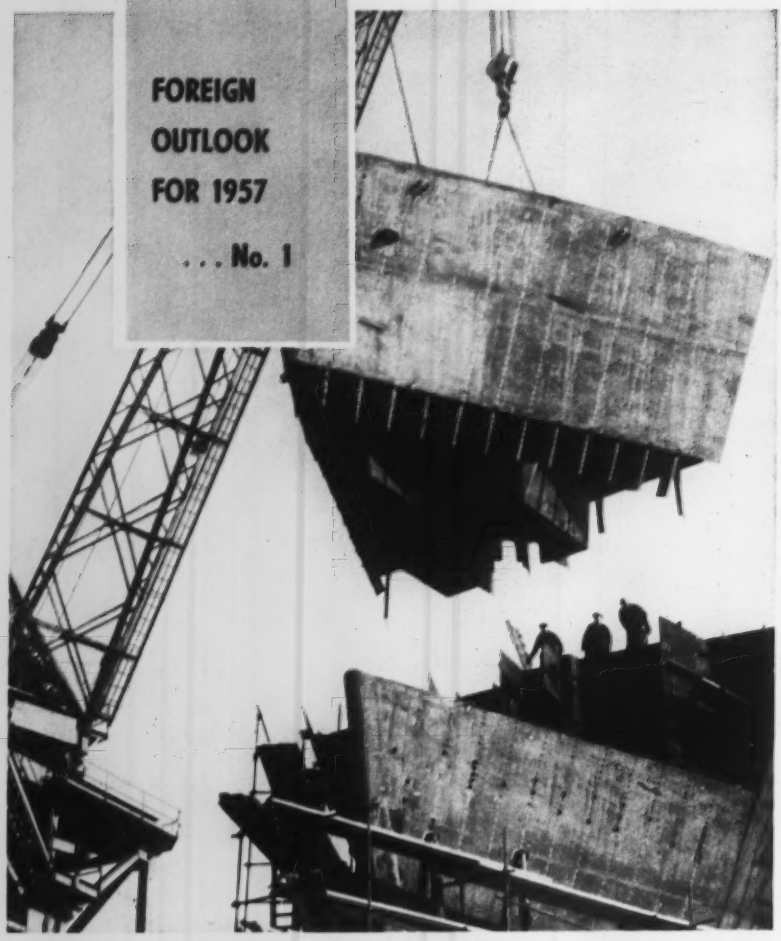
Growing Market — As one example, today's reports of new uses for steel curtain walls are in direct line with findings the researchers made several years ago. "We asked: 'How many buildings can and will use steel curtain walls? What are the advantages and selling points of steel and aluminum?' in developing these findings," Mr. Estes reports.

With facts gathered and analyzed, commercial researchers still have a hard job ahead. As Mr. Estes comments: "Facts do us no good unless they reach the right people. Budget planners need our short-range forecasts to guide their work. Long-range predictions often show need for mill expansions. Sales managers may find we aren't getting a large enough chunk of a certain market.

"Sometimes experience guides our thinking. We know that a new highway in Minnesota will require more wire mesh than a similar road in California because of weather problems in the north, but we have no precedents in solving such problems as this: How much new demand for what steel products will be created by the St. Lawrence Seaway? Which of our mills will supply the steel and when? That four-part problem faced us recently."

Vital Link — In a project of this scope, Commercial Research reports to management of the corporation's central operations. Findings help U.S. Steel maintain its industry leadership.

FOREIGN OUTLOOK FOR 1957 . . . No. 1



To cut berth time, Swedish yards prefabricate ship sections

Ore Sets Sweden's Pace

Metalworking established several records this year and promises to set more next year. Atomic energy will become more important as a source of fuel

LOOK FOR Swedish steel producers to boost their capacity 50 per cent in the next five years. Demand from abroad for special steels will continue to be strong, but increased home consumption will also necessitate the increased capacity. Sweden's per capita consumption of steel is second only to that of the U.S.

This year, the industry surpassed its production record of 1955 (2.2 million net tons) by more than 10 per cent.

In General—The Swedish economy continued its postwar growth, but at a slower rate than in 1955. Anti-inflationary measures and restricted credit have contributed to the slowdown.

Production of all manufacturing rose only 2 per cent in the first eight months of the year, compared with the same period in 1955. Despite measures against it, inflation remains a serious problem. Wages jumped about 8 per cent in 1956; retail prices were up about 5 per cent.

New Records — Because capital goods industries accounted for most of the increased production this year, metalworking fared better than the rest of the economy.

Exports of iron and steel products, including machinery, instruments and transportation equipment, matched the timber industry's exports: Each accounted for about 40 per cent of Sweden's total exports. Timber exports remained unchanged from those of 1955, while metalworking's jumped 20 per cent.

The all-time high for iron ore exports set in 1952 (15.7 million metric tons) will be beaten this year by at least 1 million tons. Iron ore loading equipment at the harbors of Narvik and Lulea is working at capacity, as are the railroads connecting the ports with the ore fields of the far north.

Sponge iron production, the Swedish specialty for powder metallurgy and special steels, was up 40 per cent in 1956, and may go up another 50 per cent in 1957.

Inconsistent — The domestic scene is not as consistently good as the export. Demand for agricultural equipment and other machinery is down from that of 1955, but the new order books of Swedish shipyards are 85 per cent heavier than they were a year ago. The yards have been working at close to capacity for four years.

Auto registrations are up 10 per cent from those of a year ago, and more cars are the homemade product: Registration of Swedish cars is up 25 per cent.

With the sounder economic structure, the Swedes have abolished almost all price controls on the few commodities that were still regulated.

Question — Fuel is the largest single item on Sweden's import list. The Suez crisis focuses attention on several facts: 1. Oil, coal and coke are coming into the country at twice the rate they did in 1949. 2. Fuel imports were 15 per cent higher in 1956 than in 1955. 3. Hydroelectric power, Sweden's only domestic source of fuel, accounts for only 15 per cent of its total energy consumption, while oil accounts for 44 per cent. 4. Fuel amounts to 20 per cent of the total dollar volume of imports.

The answer: Sweden's future economic development seems tied

to its fuel supply (as is the case with most of Western Europe). Atomic energy must soon be available to foster that growth. Steps in the right direction: The Swedish Atomic Energy Commission has requested an appropriation of about $13.6 million for fiscal 1957-58, compared with this year's allotment of $7.5 million. Plans call for construction of two atomic heating plants by 1960, one of which will generate 78,000 kw.

Between 1961 and 1966, Sweden will build two power plants capable of generating 100,000 kw each, and five reactors for residential heating.

Italy Becomes Competitive

The edge is off the boom in metalworking, but confidence remains high among Italian industrialists. Steelmaking points the way to future economic health

THE WORLD demand for steel is making Italy a major force among steelmakers. Once too expensive for world markets, Italian steel is becoming more competitive as the industry has cut costs to bring down prices. This year, Italy became a net exporter of rolled steel products for the first time.

Steel output is running 8 per cent ahead of last year's; pig iron production is up almost 13 per cent. Since 1951, Italian steel capacity has increased 88 per cent. It is now about 6.5 million tons.

Same Problem—But Italy, like the rest of Europe, faces fuel and material supply problems. Coking coal and scrap are Italy's particular bugbears. Insufficient supplies in Europe make for increased imports from the U.S., and the high cost of U.S. coal and scrap keeps steelmakers on edge.

New blast furnaces in Italy will help the scrap situation. Increased pig iron production is evidence of what Italy hopes to be as a steel producer.

Slowdown—Like Sweden (see opposite page), Italy's boom is still on, but to a lesser degree than it was in 1955. Gross national product is up 5 per cent from 1955's, and industrial production is up about 7 per cent, but those increases are less than they were in the 1954-55 period.

To avoid a stagnating economy, the government is encouraging private investments from domestic and foreign sources. Italy suffers a chronic deficiency of home capital; much support for industry comes from government loans.

Better Off — Capital goods expansion still rates better than that of consumer products industries. That's one sign of confidence on the part of Italian businessmen that the boom won't taper off disastrously.

Other good signs of economic health: Shipyards are operating to capacity and should continue to do so through next year at least. Railroad equipment production is encouraging, although it's up to prewar levels. Consumer durables output is well ahead of 1955's, including production of automobiles, trucks, motorcycles, scooters and sewing machines. Nonelectric motors, agricultural and industrial machinery also showed moderate gains. Some recession can be noted in electric motors, bicycles, tractors and trailers.

Best of All—Current expansion planned by Italian steelmakers is twice that of Germany and more than that of France, Belgium, Luxembourg and the Netherlands put together.

Suez Crisis Fans Out . . .

PROSPECTS for metalworking in Europe next year must be tempered with guesses of what the Suez Canal crisis will mean to industrial fuel supplies. About 70 per cent of Europe's gasoline and oil supplies have been cut off.

Last year, oil provided about 18 per cent of Western Europe's energy. Metalworking, particularly the steel industry, is even more dependent on oil. Don't look for any tremendous decline in the European economy next year, but be prepared for a slowdown. The facts:

Scandinavia—Oil for industry is more important in this area than in any other European area. There's little coal available, and hydroelectric power is reduced during winter. Sweden has cut industrial use of oil 20 per cent.

Great Britain—The steel industry is Britain's largest consumer of fuel oil (1.5 million tons a year). On Dec. 17, tight rationing goes into effect. It will trim consumption more than 10 per cent.

France—At least 30 per cent of France's factories depend on oil for fuel.

Italy—Ranks next to Scandinavia in its dependence on oil.

Spain—Supplies have been pruned at least 25 per cent to conserve oil in storage.

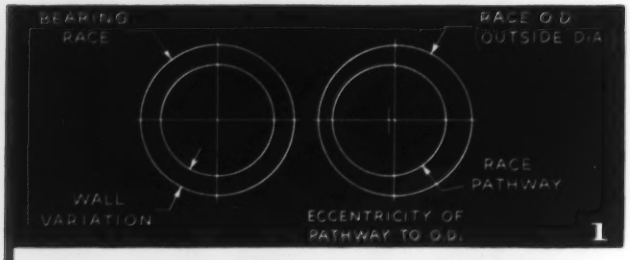
ONE OF A SERIES . . .

What makes a Hyatt roller bearing good?

CLOSE CONTROL OF INTERNAL DIMENSIONS and CLEARANCES

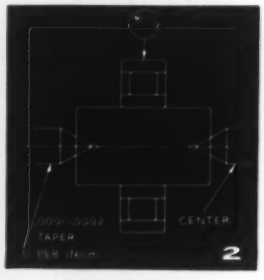
The running accuracy and smoothness of a HYATT roller bearing is governed by the tolerances of its internal dimensions and its internal clearance. Internal dimensions include concentricity of race diameters, uniformity of roller diameters and squareness of all radial and axial surfaces.

Because the internal dimensions of HYATT Hy-Roll bearings are so closely controlled, HYATTS run smoothly and quietly, last longer, and prevent equipment trouble due to excessive heat and vibration. You will find full selection and application data in HYATT General Catalog 150, or call your nearest HYATT Sales Engineer. HYATT Bearings Division, General Motors Corporation, Harrison, New Jersey. Sales offices at Harrison, New Jersey; Pittsburgh, Pennsylvania; Detroit, Michigan; Chicago, Illinois; and Oakland, California.



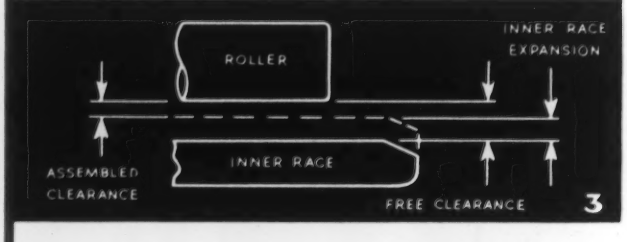
CONCENTRICITY OF RACE DIAMETERS

Concentricity of race diameters is usually defined in terms of wall variation Figure 1, of the individual races, and radial run-out of the assembled bearing. The latter is generally a user's inspection where the bearing is mounted on an arbor, Figure 2, having a slight taper (.0001" to .0002" on the diameter per inch of length) and the radial run-out indicated as shown by turning either the arbor or the outer race one revolution while the other member is held stationary and noting the difference between the minimum and maximum readings. Industry standards are available which indicate what values are acceptable.



UNIFORMITY OF ROLLER DIAMETERS

Roller diameter uniformity, which is also necessary to running smoothness, is obtained by segregating the rollers into diameter variation classes of .00005", .0001" or .00015", depending on bearing size and quality grade and assembling only rollers of the same class into a given bearing. Rollers are then matched with races which are segregated in a similar manner in order to control the diameter over or under the rollers, which governs the internal clearance spread of the mounted bearing. Figure 3 (magnified)



SQUARENESS OF RACE AND ROLLER ENDS AND FLANGE FACES

Figure 4 indicates the race surfaces which must be square with each other within minute tolerances depending on the grade of the bearing. This is to prevent roller skewing with consequent heating and noisy operation. The roller ends must also be square with the diameter for the same reason. End square tolerances are usually less than .001" for the most frequently used sizes.

GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

American design makes this Opel Rekord popular in Germany

GM Builds German Market

Its Opel accounts for 20.5 per cent of Western Germany's auto production. The car has many Chevrolet features, and GM discourages its export to this country

GENERAL MOTORS Corp. aims to increase its percentage of Germany's car market by boosting sales of Opel autos to between 240,000 and 250,000 in 1957. The Adam Opel Works, Russelsheim, Germany, is a part of GM's overseas operations.

Harlow Curtice, GM president, recently announced that 2.6 million sq ft have been added to the Opel plant. The addition, in body and press shops, plus a final assembly building, will boost capacity to 300,000 passenger cars, trucks and vans annually. Half of Opel's factory buildings were bombed out in 1944, but the plant now has a total floor area of 8.3 million sq ft. Employment this year averaged 27,300, should increase 5 to 7 per cent in 1957.

During Germany's business year, which ended in mid-August, Opel took 20.5 per cent of total passenger car production. Even though this was a drop of 3.5 per cent from the previous year, production went up (see table above). Reason: Germany's passenger car output has increased almost 37 cent this year.

Banned—The only Opel cars seen in the U.S. are those brought back by servicemen and government employees. GM does not promote Opel sales here; in fact, it discourages imports.

One reason: GM has no organized parts, sales or service setup in this country. Spare parts have to be ordered from the factory, although a New York parts dealer is planning to stock replacement units. It's also possible that Opel models would take some sales away from Chevrolet. The cars have many Chevy features, but they fall into the smaller car class, which has boomed since Volkswagens arrived in the U.S.

Model Lines—Opels are styled along American lines, but are a good bit smaller. The only exception is the Kapitan, Opel's top car, which retails for the equivalent of $2244 in Germany. It's built on a 108.27-in. wheelbase; over-all length is 186.02 in. Height is 61.42 in.

The Kapitan is powered by a 6-cylinder in-line engine with a 7.1:1 compression ratio. It puts out 81

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Willys Hails Forward Control Jeep

Enclosed cab up front is star feature of the FC-150. It has an 81-in. wheelbase and is powered by a 4-cylinder F-head engine which turns out 75 hp at 4000 rpm. Advertised delivered price for the de luxe model is $2394. On the boards: The FC-170 with 104-in. base

hp at 4000 rpm. The Olympia and Olympia Rekord are smaller than the Kapitan. They retail for $1464 and $1284. Opel also makes the Caravan station wagon ($1536), trucks and delivery vans.

Changes—European cars generally don't have to suffer through annual model changes. But the rear quarter panels and front end of the 1957 Rekord have been facelifted. Headlights are moved out and slightly hooded. The grille is close meshed and more deeply inset.

Rear fenders are finned and extend into a light unit which combines stop, turn and tail lights. The biggest improvement is a synchronized transmission which eliminates double clutching. These changes make the Rekord more similar in appearance to the Olympia and Kapitan.

Big Push—Opels have the reputation of being Germany's most popular medium priced car (American design adapted to European size). GM is urging Opel to push its Rekord this year in an attempt to dominate the lower price field, but the company faces stiff competition from Volkswagen and Ford.

About the same time Mr. Curtice announced Opel's plant expansions, Henry Ford II said that Ford Motor Co. would issue $11.9 million of new stock to Ford-Werke A. G., Cologne, Germany. That Ford facility will borrow an equal sum to continue its own expansion program which will be completed in 1957.

Old Friends—Ford of Germany makes the Taunus passenger car and Ford-Koln trucks. The Taunus probably comes closest to GM's Opel in appearance and design. Production in 1956 is estimated at 90,000 units. Ford hopes to boost that closer to 110,000 next year.

While the battle isn't quite comparable to the Chevy-Ford fight in this country, advertising claims and counterclaims will make the American visitor in Germany feel right at home. Who will win the Autobahn economy run?

U.S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,667	675,495
March	575,559	794,015
April	547,766	753,851
May	471,994	724,892
June	430,141	649,393
July	448,804	659,763
August	401,997	614,493
September	190,709	461,591
October	388,922†	517,813
10 Mo. Total	4,621,749†	6,510,814
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Nov. 3	117,583	167,278
Nov. 10	132,087	180,754
Nov. 17	135,641	179,250
Nov. 24	118,949	151,799
Dec. 1	156,681†	177,712
Dec. 8	166,500*	178,409

Source: *Ward's Automotive Reports*
†Preliminary. *Estimated by STEEL.

Two More Offer FI

At least two auto makers can't wait to follow Chevrolet's lead in fuel injection. Pontiac and American Motors Corp. are making systems available.

S. E. Knudsen, Pontiac general manager and GM vice president, asserts that early next year his division will start limited production of a V-8 engine equipped with metered injection.

American Motors is adapting the electronically actuated injection system developed by Zenith Carburetor Division, Bendix Aviation Corp., Detroit. Scheduled for the Rambler, it will feed a 327 cu in. V-8 engine, which winds up to 288 hp. Its name: Rambler Rebel.

The Bendix unit will work for Rambler, but price will be a stumbling block. Bendix has given no exact figures, but it's understood that the unit will sell for as much or more than the $485 Chevy supposedly is asking. Several other car builders (Olds and Cadillac), who aren't plagued by sales headaches, have flatly stated their systems aren't ready for production.

Ford Breaks Ground

The Ford Division has started building a 1.75 million-sq-ft assembly plant in Lorain, O. J. O. Wright, assistant general manager, says it should be finished in the summer of 1958.

Exhaust Note

• Del Harder, Ford Motor Co.'s executive vice president of basic manufacturing divisions, claims that American industry and business will have to pay $40 billion a year to replace and maintain machinery, absorb the annual growth of the labor force and provide for a nominal increase in individual productivity.

Season's Greetings

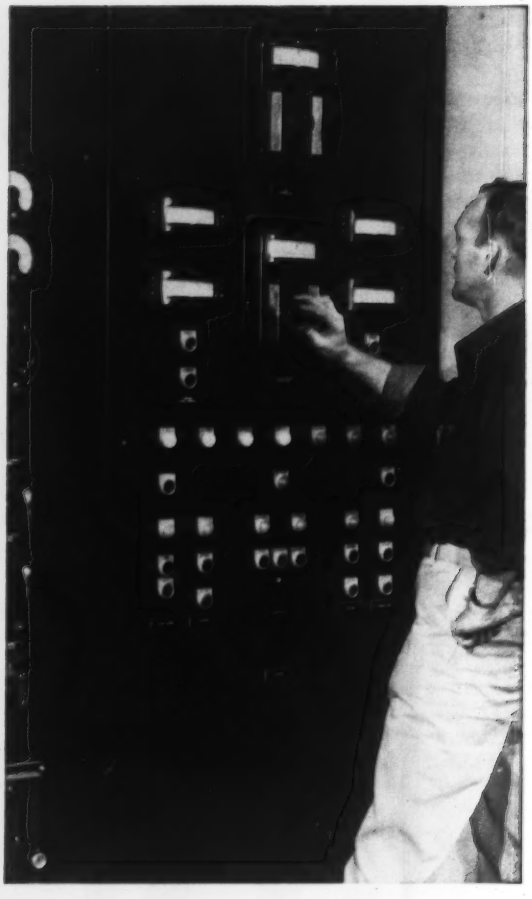
GM GENERAL MOTORS

NEW DEPARTURE
BALL BEARINGS

NOTHING ROLLS LIKE A BALL

He stirs molten steel by magnetic control to help give TIMKEN® forging steels

uniform grain size



WITH the mere turn of a dial, the man pictured here stirs molten steel in one of our huge electric furnaces. He's controlling a magnetic stirrer that assures equal distribution of alloys, uniform temperature and improved working of the slag . . . one of the quality control operations that helps give uniformity to every bar of Timken® forging steel.

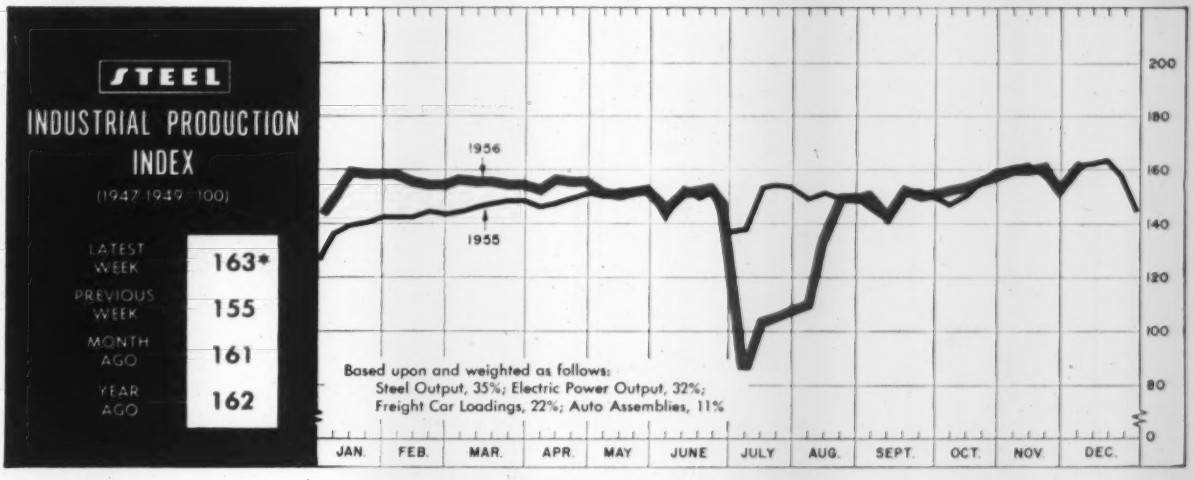
Conventional stirring is done manually with a long stirring rod. This new method does it with a travelling magnetic field set up by coils under the furnace. It's the first installation of its type in the United States. And it's another example of the Timken Company's continual search for equipment that will improve steel quality and keep it uniform.

For instance, note the uniform grain size of Timken forging steel in the photomicrograph above. We use the most modern steel-making techniques known to get this uniformity in our steel. And we examine every heat to be sure it's there. Result: you can be sure that your forgings made from this steel have uniformly high ductility and resistance to impact.

To further assure uniformity in your forgings, fewer changes in your forging procedures, your order of Timken forging steel is handled *individually*. This allows us to target our conditioning procedures to your end use requirements. In every lot you order, you get the same physical and chemical properties that you require—bar to bar, heat to heat, order to order. And helping to lower your production costs, the close dimensional tolerances of Timken forging steels produce uniform weight multiples with a minimum of steel lost in flashings, saving you steel. To get all these results in your forgings, always specify Timken forging steels. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Dec. 1.

Bellwethers Forecast Good First Half

WITH the new year just around the corner, it is clear that present prosperity has enough momentum to carry well into 1957. Several signposts point to continued upward business during the first and second quarters. (See charts, pages 116-117.)

One of the best bellwether industries in metalworking—gears—is going at the hottest pace in its history. The new order index compiled by the American Gear Manufacturers Association soared to 299.8 (1947-1949=100) during October. One industry official says the new high mark will fall in the near future. Through October, the index averages 260 per cent of the base period, compared with 199.2 last year. Lead time on gears themselves can be fairly short, but parts ordered now will show up in shipments of finished products many months hence.

Across the Board—Another good omen is the level of new orders for industrial supplies. The index of the American Supply & Machinery Manufacturers' Association Inc. rose to a peacetime high of 215.62 (July, 1948=100) in October. This index, which covers everything from nuts and bolts to cranes sold by industrial distributors, influences the planning of association members for at least 60 days.

Makers of industrial furnaces, who experienced a midyear dip in business, are anything but pessimistic. Orders during the first ten months of 1956 are 27 per cent ahead of those in the corresponding period of last year. October showed signs of a pickup from earlier months, although it dropped below October, 1955, by 9 per cent.

Average Counts—Foundry equipment makers have had their ups and downs this year, but they point out that for them the monthly average is the best business indicator. So far this year, the average is 158.8 (1947-1949=100), well ahead of the 1955 monthly average of 149.8.

Orders, shipments and backlogs are remaining at the same high level they have been all year, re-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,473[1]	2,489	2,416
Electric Power Distributed (million kw-hr)	11,600[1]	11,439	11,359
Bituminous Coal Output (1000 tons)	9,135[1]	10,420	10,460
Petroleum Production (daily avg—1000 bbl)	7,150[1]	7,195	6,836
Construction Volume (*ENR*—millions)	$377.1	$357.6	$278.8
Auto, Truck Output, U. S., Canada (*Ward's*)	191,694	146,991	213,506
TRADE			
Freight Car Loadings (1000 cars)	715[1]	651	728
Business Failures (Dun & Bradstreet)	207	240	205
Currency in Circulation (millions)[3]	$31,355	$31,269	$30,962
Dept. Store Sales (changes from year ago)[3]	+1%	+6%	+10%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,798	$25,590	$17,984
Federal Gross Debt (billions)	$276.7	$276.7	$280.2
Bond Volume, NYSE (millions)	$35.0	$23.5	$18.0
Stocks Sales, NYSE (thousands of shares)	11,286	9,002	12,490
Loans and Investments (billions)[4]	$86.4	$85.6	$85.4
U. S. Govt. Obligations Held (billions)[4]	$26.3	$25.6	$30.0
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	208.90
STEEL's Nonferrous Metal Price Index[6]	256.2	256.8	265.9
All Commodities[7]	115.9	115.7	111.1
Commodities Other Than Farm & Foods[7]	124.2	124.0	119.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

CHOICE

Take yours—

from the complete line of

JOMAC WORK GLOVES

Whatever your handling operations may be, you can choose with confidence the Jomac Gloves that are right for them. And you can be sure of getting quality—lasting quality, stemming from 18 years of pioneering and leadership in the industrial work glove field.

Jomac Work Gloves are:

- made of cut-resistant, loop-pile Jomac Cloth—the fabric that protects hands from cuts and abrasion like no other
- manufactured in knit wrist, safety cuff or gauntlet styles—in heat-resistant, flameproof, plastic-coated types
- great for economy—can be used, cleaned or reconditioned, and reused again and again
- adaptable—many styles are interchangeable, with *4* long-wearing surfaces per pair
- rugged—*they outwear canvas gloves by a profitable margin!*

Jomac manufactures all types of hand-to-shoulder protection. The choice is yours.

FREE JOMAC CATALOG

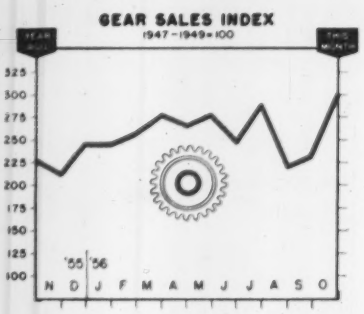
Write us (on your company letterhead) for your free Jomac Industrial Work Gloves Catalog—and for recommendations on types of gloves to use for your handling operations. We'll gladly supply sample gloves. Address: Jomac Inc., Dept. E, Phila. 38, Pa.

JOMAC

INDUSTRIAL WORK GLOVES

PLANTS IN PHILADELPHIA, PA., AND WARSAW, IND.
IN CANADA: SAFETY SUPPLY CO., TORONTO

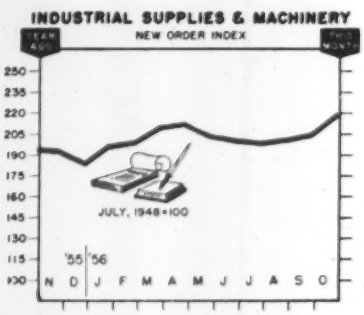
THE BUSINESS TREND



	1956	1955	1954
Jan.	245.5	140.9	167.4
Feb.	256.2	148.5	165.1
Mar.	276.5	172.8	128.6
Apr.	264.7	179.8	158.2
May	275.6	205.2	132.5
June	245.4	193.5	127.4
July	286.7	201.7	141.3
Aug.	219.5	217.6	154.7
Sept.	239.5	246.5	135.1
Oct.	299.8	227.6	152.3
Nov.	....	210.4	116.7
Dec.	....	245.5	182.2

American Gear Mfrs. Assn.

Charts copyright, 1956, STEEL.



	1956	1955	1954
Jan.	192.7	164.4	139.8
Feb.	195.9	175.1	140.5
Mar.	206.7	186.9	141.5
Apr.	208.6	173.7	131.9
May	200.6	191.6	129.4
June	197.8	189.1	136.4
July	195.6	163.7	119.4
Aug.	196.8	181.2	132.5
Sept.	200.7	203.2	148.1
Oct.	215.6	190.0	136.3
Nov.	....	189.7	146.2
Dec.	....	180.0	148.8

Amer. Supply & Machinery Mfrs.' Assn.

ports the Resistance Welder Manufacturers' Association. Through October, new orders are running 38 per cent ahead of those in the corresponding 1955 period, while shipments are 48 per cent ahead. The backlog is worth about $15 million.

On the Limb—Harold Leever, president of MacDermid Inc., manufacturer of metal cleaning, finishing and plating equipment and chemicals, says October sales of his company indicate a banner year for 1957 for American business. "Our products are the last to be ordered by our customers. They are not inventoried and warehoused, and this is the clue upon which I am basing my forecast."

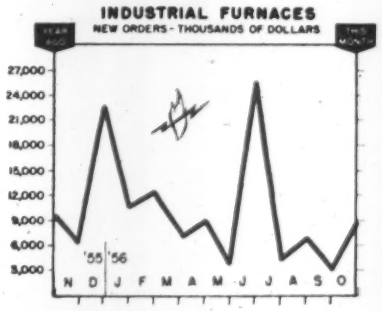
Purchasing Agents Bullish

Purchasing agents in Cleveland are bullish. They speak with authority because of the diversity of metalworking in this area. When 92 per cent of the reporting members of the Purchasing Agents Association of Cleveland Inc. report that business is the same or better than it was last month, it's an indication that metalworking throughout the nation is doing pretty well. With new orders coming in at a faster clip than they did in October, the future looks brighter than it did a month ago. The only signs of pessimism in metalworking appeared in the steel warehouse group. Its business is good but off slightly from October's.

Another element of the report worth watching for trend possibilities is the lengthening of buying policy for production materials. Members buying on a 90-day basis jumped to 53 per cent, the highest figure since the start of this survey in October, 1955. In October, only 12 per cent were buying on six months' lead time. Now 17.5 per cent are. Inventories show little change.

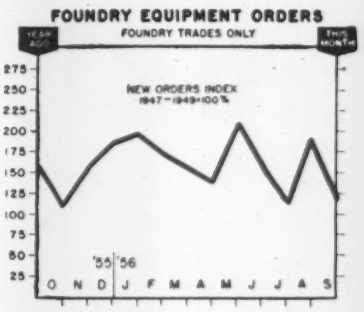
Industrial Gas Going Great

The industrial gas industry is having the best year in its history, and next year will be even better. James A. Hill, president of one of the largest producers, Air Reduction Co. Inc., says his company's sales in 1956 will be about 12 per cent higher than they were in 1955, and 1957 will be even better. His prediction: 1956 sales of about $168 million; 1957 sales, $193 million. In 1957, industrial gases will account for about $100 million,



	1956	1955	1954
Jan.	10,244	4,973	3,643
Feb.	12,163	5,616	3,086
Mar.	7,025	7,345	4,079
Apr.	8,803	7,639	3,496
May	3,620	6,205	5,848
June	25,597*	10,616*	5,663
July	4,140	4,338	1,664
Aug.	6,722	6,273	2,570
Sept.	3,057	8,351	2,534
Oct.	8,741	9,575	3,837
Nov.	....	6,180	3,188
Dec.	....	22,548*	6,847

*June, 1955, and 1956 and December, 1955, figures include steel mill furnace orders.
Industrial Heating Equipment Assn. Inc.



	1956	1955	1954
Jan.	195.6	81.0	173.8
Feb.	169.0	90.4	99.9
Mar.	152.7	163.6	82.7
Apr.	135.2	178.6	125.3
May	207.0	145.7	80.8
June	156.7	186.8	86.4
July	110.3	213.4	68.8
Aug.	188.3	134.0	75.6
Sept.	114.7	156.7	68.3
Oct.	....	108.6	147.5
Nov.	....	154.4	61.4
Dec.	....	183.9	113.9

Foundry Equipment Mfrs. Assn.

breaking the century figure for the first time in the company's history. About the long-term future, Mr. Hill says: "There will be peaks and valleys, but the advances will exceed the declines by many times."

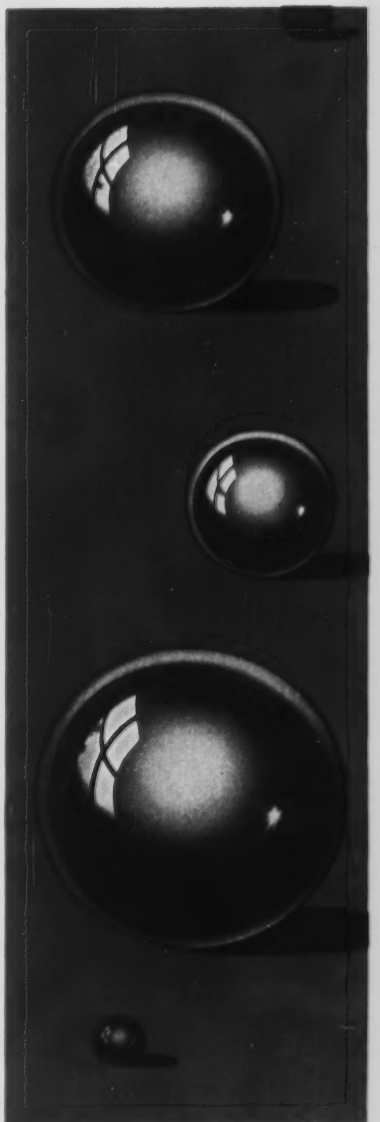
One Step Nearer Record

After taking a breather for Thanksgiving, STEEL's industrial production index in the week ended Dec. 1 took one more step toward a record, chalking up a preliminary score of 163 (1947-1949 = 100). This is just 1 point shy of the high mark of 164 set during the week ended Dec. 17, 1955. On the basis of the trend over the last three weeks, that mark should be reached during the week ended Dec. 8 and topped in the following week as auto production reaches its 1956 high point. For 48 weeks of 1956, the index averages 149 of the base period, just 1 point lower than the 1955 weekly average despite the steel strike.

Electric utilities are joining the auto industry to provide the punch that will send production records over the top this month. For 12 consecutive weeks, power output has topped the 11 billion kw-hr mark, matching the string put together in the first quarter. The industry's record of 11.614 billion kw-hr a week (set last December) is expected to fall sometime this month. It's an indication of the breakneck pace at which the economy is running. The industry has no intention of slowing down. Order backlogs for heavy electrical equipment are growing. A Westinghouse Electric Corp. official says: "The curve for the consumption of electricity and installations is still going up."

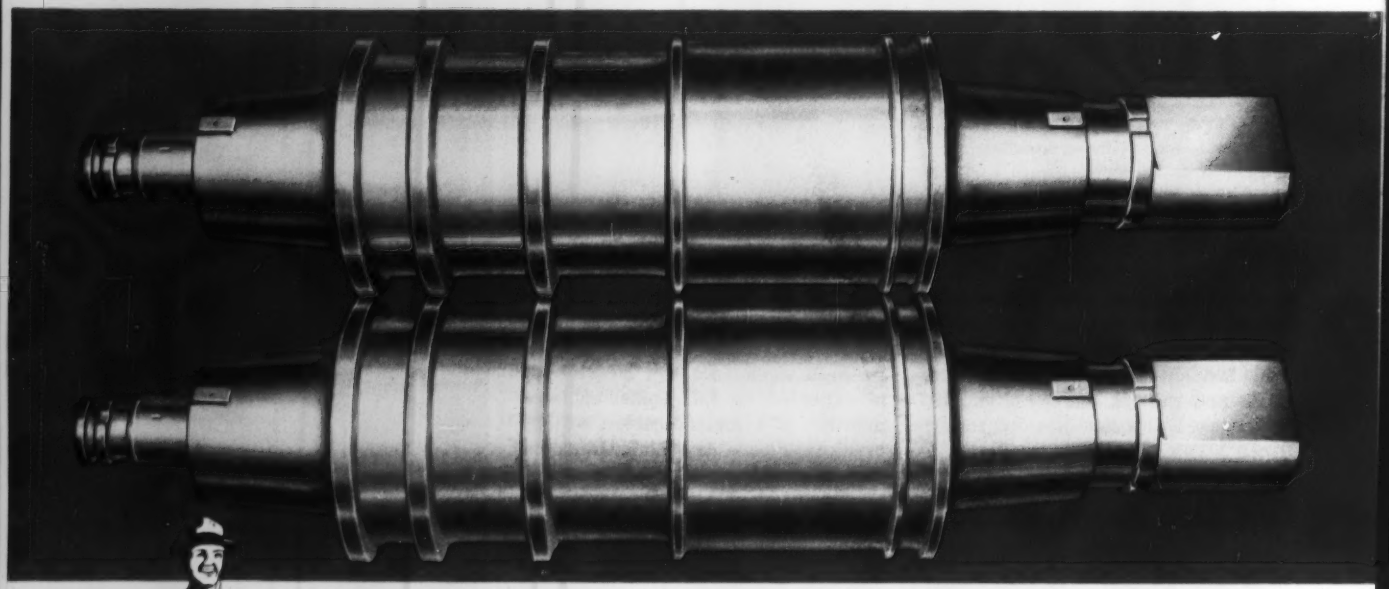
Trends Fore and Aft

- Orders for industrial gas equipment indicate that business in 1957 will be at approximately the same peak level attained in 1956, says Edward J. Funk Jr., chairman of the industrial gas equipment division of the Gas Appliance Manufacturers Association.
- Bituminous coal production in 1957 will be 532 million tons, compared with 509.6 million tons this year, estimates the National Coal Association.
- The average income of an estimated 51 million men with money incomes was a record $3400 in 1955, the Census bureau reports.



Ohio Rolls

correct roll design— rigid quality controls— where roll life begins!



The service life of Ohio Rolls begins with integrated planning by a group of specialists analyzing roll requirements . . . Ohio's designers—metallurgists—chemists —engineers—foundrymen—and inspectors . . . working directly with your Ohio Roll Representative. Their job is to make sure that Ohio Rolls meet rigid job specifications—in design, metal analysis, hardness, tensile strength, dimension and finish. These are operations that require specific planning to make certain that Ohio Rolls deliver High Tonnage . . . give Long Life . . . and Satisfactory Service.

OHIO ROLLS SERVE THE WORLD

When you need rolls—large or small—call in your Ohio Roll Representative. He understands production requirements, and he can help you solve your roll problems quickly and efficiently.

shaping metal for all industry

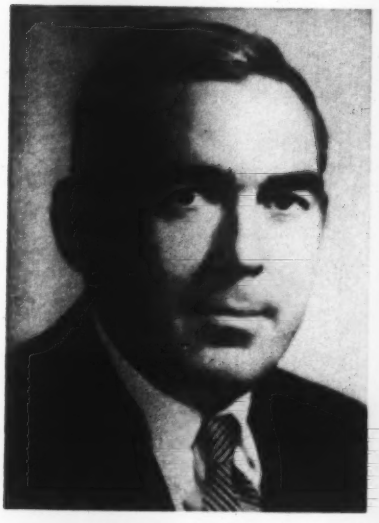
Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Ohio Double-Pour Rolls
Chilled Iron Rolls
Denso Iron Rolls
Flintuff Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Forged Steel Rolls

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO

Plants at Lima and Springfield, Ohio

ORS



ROBERT B. MANNING
. . . president of Sperry Western

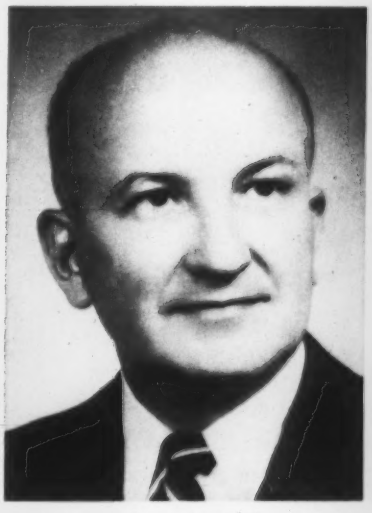
Robert B. Manning, vice president-treasurer, Sperry Western Inc., Lafayette, Iowa, was elected president. **Clinton R. Hilliker** was made operating manager. Mr. Manning continues as assistant to the president and as products manager of the parent firm, Sperry Products Inc.

James P. Haight was elected vice president in charge of engineering and purchasing for **Aluminum Co. of America,** Pittsburgh. He succeeds **Thomas D. Jolly,** retired. Mr. Haight became chief engineer in 1954 and vice president last April.

Russell P. Wynings was made manager of sales, **Gulf States Tube Corp.,** Rosenberg, Tex., subsidiary of Michigan Seamless Tube Co. He was assistant sales manager of the parent firm. **James E. Wiseman** was made plant superintendent in Texas.

Eduard Baruch was elected a vice president of **Topp Industries Inc.,** Los Angeles. He is president of Heli-Coil Corp., Danbury, Conn., newly acquired subsidiary of Topp Industries.

Robert W. Pearson fills the new post of deputy general manager for operations at the electronics division of **American Machine & Foundry Co.,** Boston. He is responsible for engineering, manufacturing, material and quality control departments.



HARRY L. JENTER
. . . AS&W vice president-operations

Harry L. Jenter was named vice president - operations, **American Steel & Wire Division,** U.S. Steel Corp., Cleveland. He succeeds **Van H. Leichliter,** now president of the division. **Walter L. Longnecker** was named Cleveland district manager of operations to succeed Mr. Jenter, and is replaced by **James J. Dalton** as general superintendent, Cuyahoga Works.

Anthony Maladra was made sales manager, **KSM Products Inc.,** Merchantville, N. J.

J. L. Tunstead, sales manager, metal products division, **Koppers Co. Inc.,** Pittsburgh, was appointed a vice president. He is succeeded at Baltimore by **Harry P. Neher, Jr.** Mr. Tunstead also was made director of sales and assistant manager of the marketing department. He has headquarters in Pittsburgh.

Richard T. Thornton was made manufacturing manager, general products division, **Ford Motor Co.,** Dearborn, Mich. He was assistant director, manufacturing engineering office.

Paul R. Flood was made general manager of the Beloit, Wis., plant of **Fairbanks, Morse & Co.** Formerly general manager of the plant at Pomona, Calif., he succeeds **W. E. Watson,** who resigned to join Beloit Iron Works as general plant manager.

REGIS O. BRIDGE
. . . purchasing dir. at Crucible

Regis O. Bridge was made director of purchases for **Crucible Steel Co. of America,** Pittsburgh. He was purchasing agent. **Herbert J. Arnold** was made supervisor of stainless flat rolled product sales; **Frederick H. Thoke,** supervisor of stainless bar wire and billet product sales.

Kenneth W. Donle was made manager of product engineering for **Tube Reducing Corp.,** Wallington, N. J. He also is responsible for new product development. Mr. Donle was manager, Rockdrawn Tubing Division.

Dean Shepherd was appointed purchasing agent, Terre Haute, Ind., Works, **Allis-Chalmers Mfg. Co.** Former engineer in charge of product engineering, he succeeds **R. W. Peterson,** resigned.

R. J. Sullivan was made director of quality control for **Vickers Inc.,** Detroit. He will co-ordinate activities at manufacturing divisions in Detroit, Omaha, Nebr., Joplin, Mo., and Jackson, Miss.

Arthur F. Jacques succeeds the late **Howard N. Kyser** as vice president-general manager, **A. J. Lindemann & Hoverson Co.,** Milwaukee, subsidiary of Norris-Thermador Corp.

Emerson Electric Mfg. Co., St. Louis, appointed **George H. Childers** merchandise sales manager;

KARL C. SCHMEDICKE
. . . Lamson Mobilift mfg.-manager

ARTHUR A. ARCHER
. . . Mosebach Electric v. p.-eng.

JOHN F. OVSIK
. . . Vulcan Containers p. a.

Edward K. Handlan, manager of air conditioning sales.

Karl C. Schmedicke was made manager of manufacturing for **Lamson Mobilift Corp.**, Portland, Oreg. He was with Lamson Corp., affiliate company.

Clyde A. Rodgers was named assistant superintendent of oxygen steelmaking production at **Kaiser Steel Corp.'s** Fontana, Calif., Works.

Truscon Steel Division, Republic Steel Corp., Youngstown, appointed as acting superintendents: **Alfred Collier**, structural steel; **Mathias Kutsko**, stainless steel windows; **James L. Williams**, machine shop.

Henry M. Haase was elected vice president of engineering and research for **Borg-Warner Corp.**, Chicago. He joined the corporation in 1955 as assistant to the president.

Thomas J. Carbine was made Philadelphia district sales manager for **Laclede-Christy Co.**, division of H. K. Porter Company Inc.

A. R. Reinarz was made chief engineer and **Richard N. Cordrey**, assistant chief engineer at the Toledo, O., plant of **National Supply Co.** Mr. Reinarz succeeds **H. L. Willke**, recently named assistant director of engineering at Pittsburgh.

Arthur A. Archer was elected vice president - engineering, **Mosebach Electric & Supply Co.**, Pittsburgh. Since joining Mosebach several years ago, Mr. Archer has served in development of its industrial motor resistor.

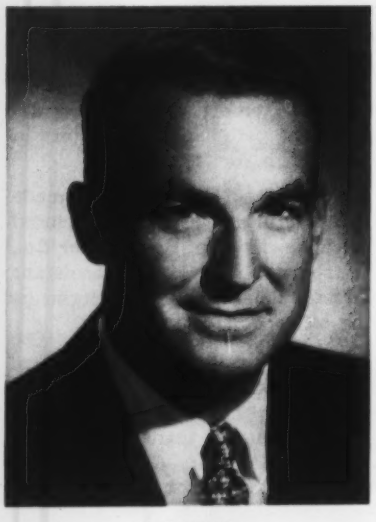
S. S. "Bert" Inch was named vice president and director of sales for **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. Formerly vice president of Kaiser Aluminum & Chemical Sales Inc., subsidiary, he continues headquarters at Oakland. **John E. Menz** succeeds Mr. Inch and continues headquarters in Chicago where he was general sales manager for the subsidiary.

John F. Ovsik was made director of purchases for **Vulcan Containers Inc.**, Bellwood, Ill.

Robert P. Ricker was made New York district sales manager, **Pressed Steel Tank Co. James A. Varnado** transferred to the Downingtown, Pa., office, to replace Mr. Ricker.

Inland Container Corp. named **Robert B. Turner** division sales manager, with headquarters in Indianapolis. He is succeeded as Ashtabula, O., plant sales manager by **Kenneth W. Hall.**

Raymond A. Simmons was made



S. S. INCH

JOHN E. MENZ
. . . executive appointments at Kaiser Aluminum & Chemical

A MILE OF BLOOD VESSELS FOR A ROBOT

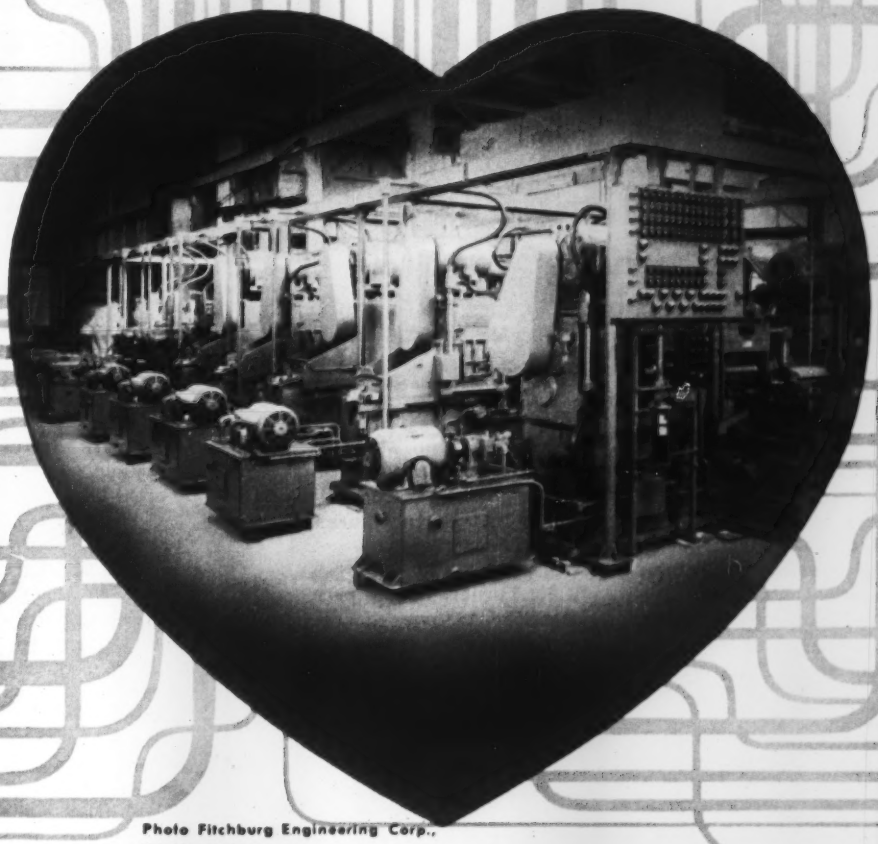


Photo Fitchburg Engineering Corp., Fitchburg, Mass.

This mechanical giant was designed and built by Fitchburg Engineering Corporation. It is a 23-station transfer machine for milling, boring, drilling and reaming automatic transmission cases for new cars. Its "blood vessels" are many sizes of low carbon steel SAE hydraulic tubing by Superior, carrying pressures up to 1000 psi throughout the system. The breakdown of just one "blood vessel" could stop not only the machine but the entire production line—a very costly mischance. Superior tubing was chosen because it provides a dependable, leakproof hydraulic system.

Superior specializes in seamless low carbon steel tubing for all hydraulic purposes. Some sizes can bear working pressures up to 12,000 psi. The steel has a maximum carbon content of only .12%, which results in high ductility, permitting easy hand bending and flaring. This non-aging steel holds its ductility and impact resistance during storage and/or use.

All Superior hydraulic tubing is 100% hydrostatically tested at maximum working pressures. Constant quality control during production assures clean, smooth inside surfaces that minimize pressure drop due to back pressure from internal friction.

If you have hydraulic tubing problems, let Superior's tubemanship and years of industry-wide experience help solve them for you. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa., for Bulletin No. 29 giving additional technical data on hydraulic tubing.

Superior Tube

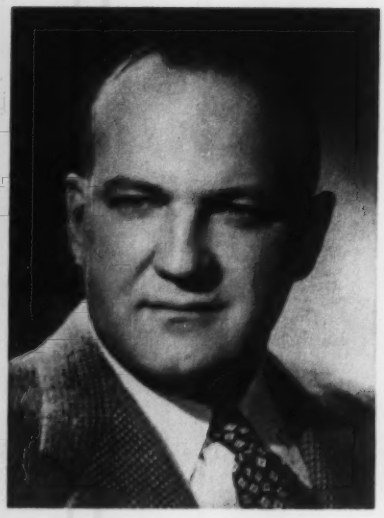
The big name in small tubing

NORRISTOWN, PA.

All analyses available in .010 in. to 5/8 in. OD—certain analyses in light walls up to 2 1/8 in. OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

J. S. GILLESPIE
. . . GE metallurgical products post



ROBERT J. SUTTON
. . . Atkins Saw purchasing dir.

RICHARD F. BURKE
. . . Tube Manifold sales manager

an assistant purchasing agent of **Pratt & Whitney Co. Inc.**, West Hartford, Conn.

J. S. Gillespie, acting manager of the industrial diamond project for **General Electric Co.'s** Metallurgical Products Department, Detroit, was named manager of engineering in addition to his present duties.

Chrysler Corp. named **William O. Collins** manager of its By-Products Department, central purchasing, Detroit, to succeed **George B. Wells**, retired. **M. D. McQuary**, former pattern buyer for the raw material department, central purchasing, was made purchasing supervisor for the forge and foundry division.

General Electric Co.'s silicone products department created two new sales districts. **Milton C. Lauenstein** heads the Chicago district; **Robert T. Daily**, the western district, with headquarters at Los Angeles.

Robert J. Sutton was made director of purchases at **Atkins Saw Division**, Borg-Warner Corp., Indianapolis. He continues as secretary-treasurer.

R. K. Turner, a vice president of Bakelite Co., was made a vice president of **Carbide & Carbon Chemicals Co.**, New York. His activities concern plastics operations of both companies, which are divisions of Union Carbide & Carbon Corp.

George E. Dyke was elected vice chairman of **Continental Can Co.**, New York. **Raymond F. DeVoe**, **Norman F. Greenway** and **Robert L. Fitts** were elected vice presidents. Mr. Dyke was chairman and president of Robert Gair Co. Inc., recently merged with Continental.

Wheeling Steel Corp. appointed **R. L. Jolly** general manager of its Martins Ferry, O., factory; **R. W. Oldham**, general manager of its Steelcrete and Wheeling factories.

Richard F. Burke was made sales manager, **Tube Manifold Corp.**, North Tonawanda, N. Y.

Leonard J. Edwards was appointed manager, furnace and oven division, **W. S. Rockwell Co.**, Fairfield, Conn. He was vice president of C. I. Hayes Inc.

Francis G. Tatnall was made vice president-general manager of Budd Co.'s newly established subsidiary, **Tatnall Measuring Systems Co.**, Philadelphia. He was manager of testing research for Baldwin-Lima-Hamilton Corp.

S. Allen Oviatt was named manager, special product sales, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa. He continues direction of turbine blading sales in addition to other special products.

Ducommun Metals & Supply Co., Los Angeles, appointed **Richard C. Simpson** director of marketing development; **James J. Shelton**, manager of sales planning.

OBITUARIES . . .

Paul A. Johnson, 64, a partner in **Grand Haven Brass Foundry**, Grand Haven, Mich.; president of Grand Haven Stamped Products Co., died Nov. 27.

Keith R. Rodney, 81, a director of **Edgcomb Steel & Aluminum Corp.**, Hillside, N. J., died Nov. 24. He retired in May of this year as assistant secretary.

Myron J. Hayes, 65, retired vice president, **Eastman Kodak Co.**, Rochester, N. Y., died Nov. 22.

Thomas A. Hammer, recently retired from **Federated Metals Division**, American Smelting & Refining Co., died Nov. 22 in New York.

G. Fitch Cady, 66, a partner in **Cady Metal Fabricating Co.**, North Tonawanda, N. Y., died Nov. 25.

Thomas J. McCue, 40, Philadelphia district sales manager, **Wyckoff Steel Co.**, died Nov. 19.

Alfred A. Baldwin, 67, retired chief chemist, **Bridgeport Brass Co.**, Bridgeport, Conn., died Nov. 21.

Users of tubing for cylinder applications now you can have this new...

J&L Cold Drawn ELECTRICWELD

Tubing with a Special Smooth ID Finish

Reduces your overall production costs in applications like these . . .

- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J&L Cold Drawn ELECTRICWELD Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favorable weight-to-strength ratio for applications in which loading occurs in all directions.

J&L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ½ inch to 2⅞ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134 inch respectively.

This new booklet provides the information you need . . . specifications . . . tolerances . . . chemistry . . . mechanical properties . . . annealing . . . finishes.

Send for your free copy today!

J&L STEEL

Jones & Laughlin Steel Corporation
Dept. 404, 3 Gateway Center, Pittsburgh 30, Pa.

Send me a copy of your new Cold Drawn ELECTRICWELD Booklet.

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Title _____

Company _____

City _____ **Zone** _____ **State** _____

Is your part illustrated? These are representative of the shapes that can be cold formed more effectively with Granodraw.

GRANODRAW® PROCESS INCREASES TOOL LIFE 2-5 TIMES IN COLD HEADING STEEL FASTENERS

Thorough research, in cooperation with a leading manufacturer of headed fasteners, has proved the value of Granodraw phosphate coating of stock prior to cold working. Typical of the improvement in tool life and in production are the examples shown in the table.

But the advantages do not stop here in cold heading fasteners or cold working other products. This chemical treatment process permits greater speed of draw; greater reductions within the physical limits of the metal; more passes with the same number of intermediate treatments; and the possibility of fewer process anneals. It also results in less downtime of machines, better surface finish on products, cold forming of more complex shapes, fewer rejects, and a cleaner shop.

Write us for complete information about Granodraw and its application in cold forming operations.

PRODUCTION AND TOOL LIFE

PRODUCT	MATERIAL		AV. PIECES PER DIE DRESSING	
	Tool	Stock	Granodraw-Treated	Other Treatment
⅜ x ⅞ rivet	Hardened Alloy Steel	1010 Steel	647,000	180,500
5/16 x 24 flat head shoulder bolt	Hardened Alloy Steel	1010 Steel	26,000	5000-8000
Hex Head Cap Screws	Hardened Alloy Steel	1038 Steel	53,000	13,000-14,000
¼ x 20 Hex Machine Bolt	Hardened Alloy Steel	1018 Steel	28,000	13,000

Note. Although investigations on the life of carbide tools are not completed, one item deserves mention. A 5/16 x 24 hex head shoulder bolt showed a strikingly low carbide tool life of 67,000 pieces per die. Using Granodraw-treated rod, one die produced 105,000 pieces—another 194,000 pieces. And both dies were in good condition at the end of the run.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICHIGAN ST. JOSEPH, MISSOURI NILES, CALIFORNIA WINDSOR, ONTARIO

CHEMICALS ACP PROCESSES

Federated To Build

Secondary aluminum smelter at Alton, Ill., will have annual capacity of 72 million lb

AMERICAN Smelting & Refining Co., New York, will double the aluminum output of its Federated Metals Division. A secondary aluminum smelter, having an annual capacity of 72 million lb of aluminum alloy ingot, will be built at Alton, Ill.

Frederick Walker, vice president in charge of the Federated Metals Division, says the plant will be the most modern smelter of its type ever constructed and will be among the largest ever built to handle aluminum scrap metals. Self-sufficient laboratories containing quantometric and chemical testing facilities are included in the plan. Modern scrap handling, furnacing, casting, ingot handling and shipping facilities will give the plant wide flexibility.

New Divisions—To handle the output of the new smelter, Federated will establish new sales and purchasing divisions at Alton.

Federated operates additional secondary aluminum smelters at Perth Amboy, N. J., Los Angeles and Detroit. Aluminum warehouse facilities are maintained in nine major industrial areas throughout the U.S.

Construction of the Alton smelter will begin in early 1957. When capacity is reached about one year later, Federated will be the world's largest smelter of secondary aluminum, says Mr. Walker.

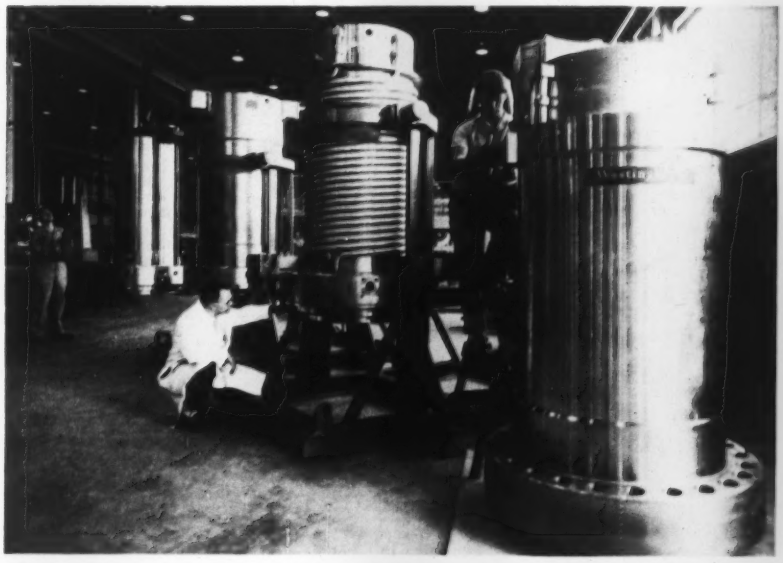
Buys Vacuum Casting Furnaces

Austenal Inc., New York, says it will have the first production installation for vacuum investment casting. Melting and casting in a vacuum permits the utilization of "superalloys" which previously were not readily castable by more conventional methods. The firm has ordered a number of vacuum furnaces which were designed for the process by it and the manufacturer, F. J. Stokes Corp., Philadelphia. They will be erected early in 1957.

Carpenter Steel Opens Branch

Carpenter Steel Co., Reading, Pa., opened a mill-branch warehouse and office in Houston. Charles E. Miller, branch manager, is in charge of the warehouse. It operates under the jurisdiction of

(*Please turn to page* 128)



Pumps for Atomic Power Station near Completion

These four 1600-hp, 2300-volt "canned" motor pumps are being constructed at Westinghouse Electric Corp.'s atomic equipment plant at Cheswick, Pa. They are the main coolant pumps for the nation's first full-scale atomic electric generating station at Shippingport, Pa. Each pump weighs nearly 14 tons, stands 10 ft high, is 4 ft in diameter and has a capacity of 18,300 gpm

CHEMICALS ACP PROCESSES

used in the chemical treatment of metals

PAINT BONDING

Granodine® forms a phosphate coating base on iron and steel products—provides an excellent bond for paint, and greatly improves the corrosion resistance of the paint system.

Alodine® forms an amorphous film on aluminum which protects the metal and anchors the paint finish. Alodized aluminum meets service specifications.

Lithoform® promotes a good bond for paint on galvanized iron, zinc and cadmium plated surfaces. Also prevents any objectionable chemical reaction between applied paint film and the metal surface. One grade of Lithoform, in itself, provides excellent corrosion resistance on zinc and cadmium.

PROTECTION FOR FRICTION SURFACES

Thermoil-Granodine® forms a manganese iron phosphate surface which materially reduces wear and minimizes galling by eliminating metal-to-metal contact. It is particularly effective during break-in period of bearing surfaces.

RUSTPROOFING

Permadine®—a zinc phosphate coating chemical—forms a heavy oil-adsorptive crystalline coating on steel. Bonds paint or such rust-inhibiting oils as Granoleum®.

Thermoil-Granodine®—a manganese iron phosphate coating chemical—forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

IMPROVED DRAWING AND COLD FORMING

Granodraw® for steel, Granodraw SS for stainless, and Alodine® for aluminum for an integral coating with the base metal which facilitates the cold mechanical deformation of the metal, improves drawing characteristics, and lengthens die life.

AMERICAN CHEMICAL PAINT CO.
Ambler 19, Pa.

STEEL

Painting is easier with a bucket which has a dependable, easy-to-use handle made from low carbon, hard drawn CF&I-Wickwire Pail Bail Wire.

Chances are you don't need pail bail wire to make paint bucket handles. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

the painter's helper

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

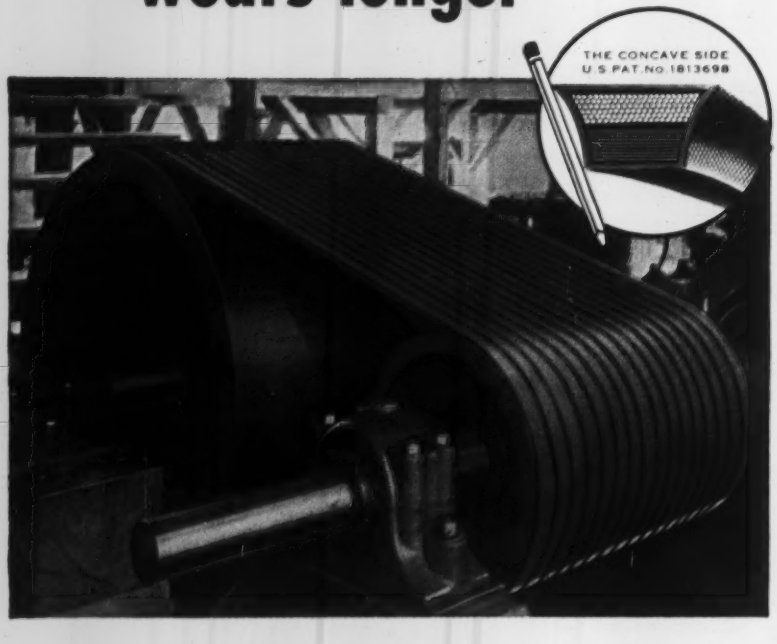
CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque · Amarillo · Billings · Boise · Butte · Casper Denver · El Paso · Ft. Worth · Houston · Kansas City · Lincoln (Neb.) · Oklahoma City · Phoenix Pueblo · Salt Lake City · Wichita · PACIFIC COAST DIVISION—Los Angeles · Oakland · Portland San Francisco · Seattle · Spokane · WICKWIRE SPENCER STEEL DIVISION—Atlanta · Boston · Buffalo Chicago · Detroit · New Orleans · New York · Philadelphia · CF&I OFFICES IN CANADA: Montreal · Toronto CANADIAN REPRESENTATIVES AT: Calgary · Edmonton · Vancouver · Winnipeg

4243

Why a V-Belt with CONCAVE SIDES wears longer

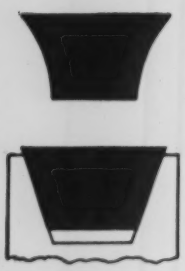


It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight*. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with Concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*



There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 90

Gates VULCO ROPE Drives

(*Concluded from page* 125)

W. J. Ervin, district manager, with headquarters in Indianapolis.

Ryerson Improves Facilities

Equipment for the abrasive disc cutting of stainless plates is in operation at the Chicago plant of Joseph T. Ryerson & Son Inc., steel distributor. The machine, built by Ty-Sa-Man Machine Co., Knoxville, Tenn., can handle plates up to 12 ft wide by 25 ft long. It may also be used to cut aluminum and carbon steel plates when precision is required.

The company improved its Spokane, Wash., steel service plant by erecting an office building containing about 4500 sq ft of space. It forms an integral part of the plant, which is at North 207 Freya St., that city.

Metal & Thermit Equips Plant

Production equipment is being installed in the new combined office, warehouse and manufacturing facility of Metal & Thermit—United Chromium of Canada Ltd. in Toronto. Manufacturing operations will be in full swing by the end of this month. Products will include chromium, copper and nickel plating materials, liquid dips, organic protective coatings and welding compounds.

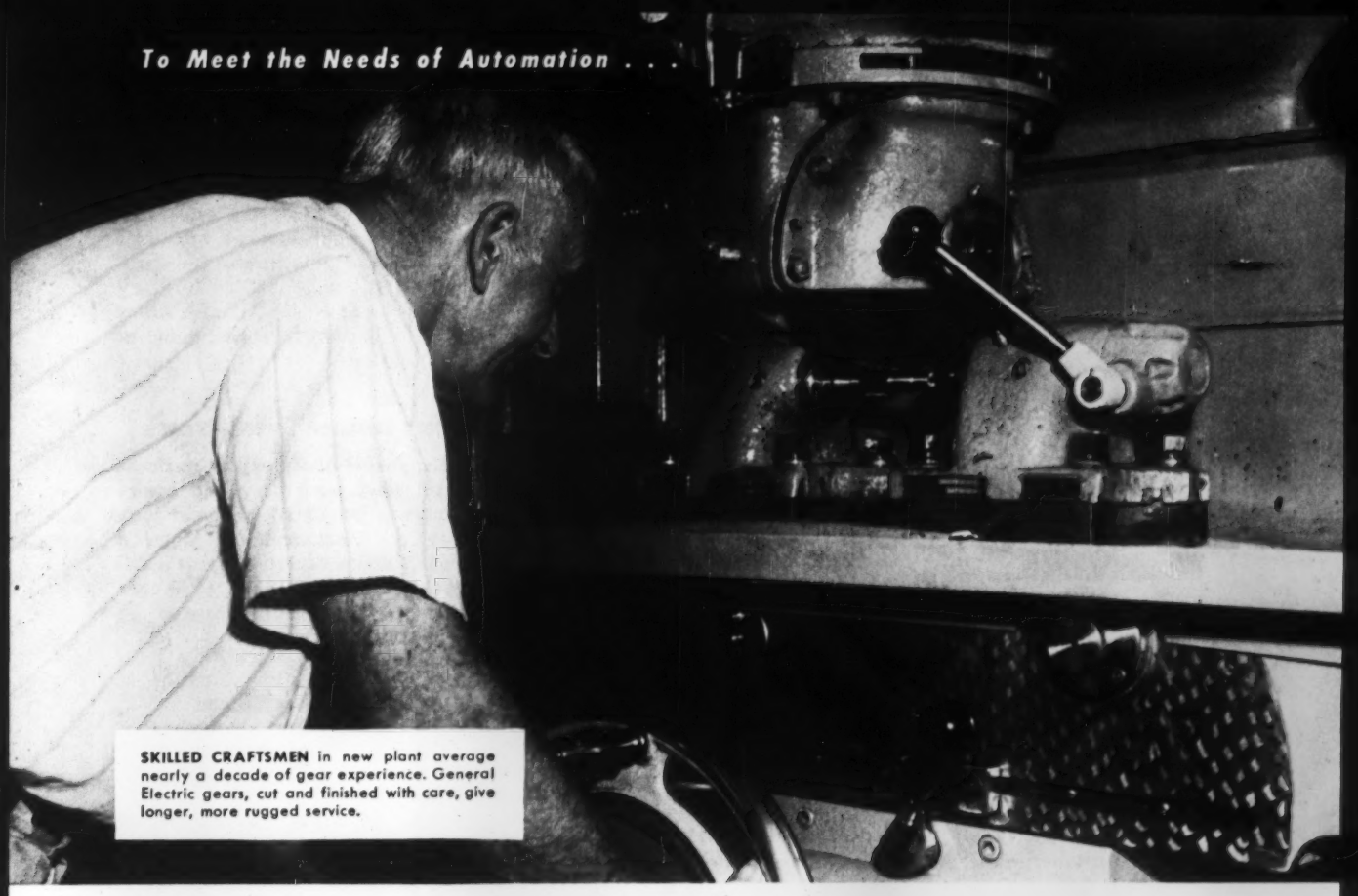
Heppenstall Opens Warehouse

Heppenstall Co., Pittsburgh, established a warehouse at 3000 Shelby St., Indianapolis, Ind. The steel forging firm is maintaining die block stocks for the press and drop forging industry at the new location.

Dayton Steel Foundry Expants

Recent expansion of the Dayton (O.) Steel Foundry Co. has necessitated the installation of new equipment in the firm's main plant and those of its subsidiaries, Moraine Mfg. Inc. and Dayton-Portsmouth Foundry Co. The bulk of the machinery consists of multiple spindle automatic lathes, automatic tappers, drill presses and specialized machines. This equipment will permit the firm to enter the light truck and the heavy

To Meet the Needs of Automation . . .



SKILLED CRAFTSMEN in new plant average nearly a decade of gear experience. General Electric gears, cut and finished with care, give longer, more rugged service.

At General Electric's NEW Gear Motor and Transmission Components Department . . .

3618 man-years of manufacturing know-how assure fast service on low-speed drives

To meet the increased demand for low-speed drives, General Electric's new decentralized Gear Motor and Transmission Components Department will be devoted solely to the design and manufacture of mechanical power transmissions.

•Specialized Attention—Highly trained and experienced gear-motor engineers and skilled craftsmen with over 3600 man-years of experience are available to help solve your low-speed drive problems. They are ready to give you fast, dependable G-E service on standards, on specials, and on new gear-motor products.

•Complete Line Available—General Electric offers a complete line of gear-motors—induction, synchronous, wound rotor, d-c gear-motors—in all types and enclosures, from 1/100 to 200 hp. The new department will also give you rapid service on special needs such as adjustable speed, braking, special mounting or special insulation.

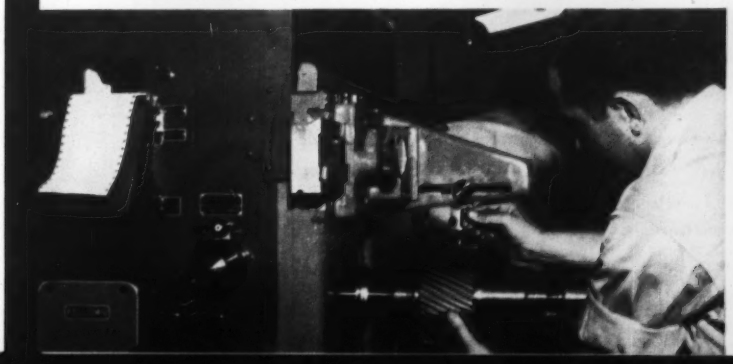
•Fast Service—The expanded gear-motor facilities allow quantity production and shorter manufacturing cycles. Machine tools in the new factory are designed for high volume precision work and are readily adaptable for the production of specials built to your specifications.

•For More Information—Write for bulletin GEA-6027, Section 851-2, Schenectady, N. Y., or contact your G-E Apparatus Sales Office or gear-motor supplier. Gear Motor and Transmission Components Department, General Electric Co., Paterson, N. J.

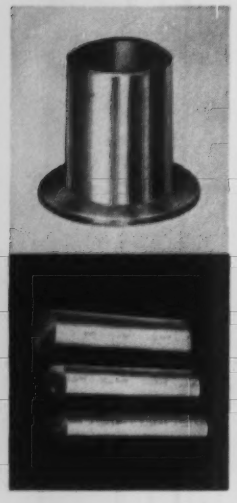
Progress Is Our Most Important Product

GENERAL ELECTRIC

CONTINUOUS TESTING provides data for quality control, new designs and developments. Here, an involute measuring instrument records wear, under simulated tortuous conditions, to nearest ten-thousandths of an inch.



QUANTITY PRODUCTION of complete line of G-E gear-motors from 1/100 to 200 hp, in all types and enclosures, assures prompt customer service. Specify General Electric for all your low-speed drive needs.

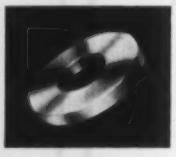


THE *simplest answer* TO YOUR BEARING PROBLEMS

The availability of oil-filled, self-lubricating sintered powdered Bronze Bearings is greatly enlarged by the many sizes that are included in the new Bunting Standardized sintered Bronze stock line. Chemical and physical specifications of these Bunting stock bearings are ASTM-B202 Type I, Class A. The material also meets the requirements of SAE Type I Class A, AMS-4805 and MIL-B-5687A Type I Comp A. The basic composition is 90% copper and 10% tin of high purity.

This high quality powdered bronze with built-in lubrication together with Bunting Cast Bronze Bearings made of Bunting No. 72 Bronze (SAE-660) give mechanical production and maintenance the means of finding the simplest, best and most economical answer to any bearing problem.

BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.



Bunting®

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL

The Bunting Brass and Bronze Company, Toledo 1, Ohio

Branches in Principal Cities • Distributors Everywhere

earthmoving equipment fields.

To Enlarge Buffalo Warehouse

Enos & Sanderson Co. (steel and industrial supply house) will erect a 25,000-sq-ft addition to its warehouse and plant at 2080 Military Rd., Buffalo, N.Y. All operations of the firm will be consolidated at this location.

Export Division Opens Branch

Expansion of its export business in oil field machinery and equipment has prompted National Supply Co., Pittsburgh, to open a branch office for its Export Division at Houston. James C. Woods is manager. He is assisted by B. K. Barstow.

Industrial Research Soars

American industry continues to formulate plans for the rapid expansion of its research and engineering facilities. Among recent announcements of such plans:

Timken Roller Bearing Co., Canton, O., will construct a $500,000 metallurgical research laboratory on Harrison avenue, that city.

Avco Mfg. Corp., New York, is building a major research and development center in Wilmington, Mass. Four buildings with a total of more than 400,000 sq ft of floor space are planned.

Speer Carbon Co., St. Marys, Pa., is constructing a research and development laboratory at Niagara Falls, N. Y.

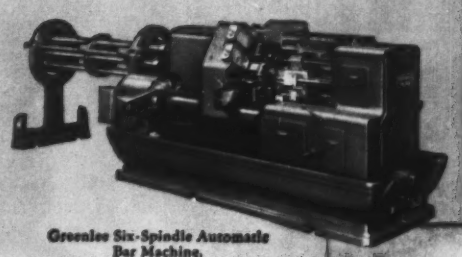
O. Hommel Co., Pittsburgh, will establish a porcelain enamel research center directly across from the firm's main office building.

Sylvania Electric Products Inc., New York, expects to start construction in the spring on an electronics and research center in Amherst, N. Y., near Buffalo. The project will cost between $1.5 million and $2 million. The building will have more than 100,000 sq ft of floor space.

Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., New York, will erect a multimillion dollar engineering building at South Charleston, W. Va. The structure will provide space for more than 500 engineers who will design equipment

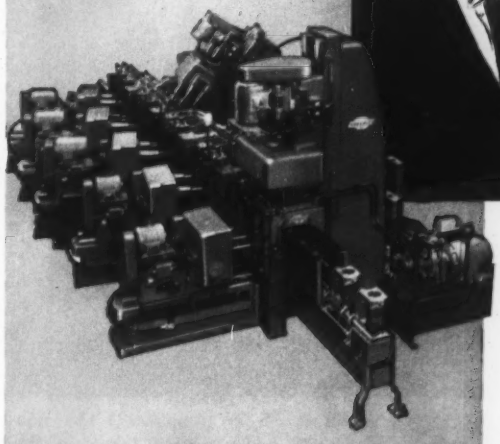
GREENLEE OFFERS

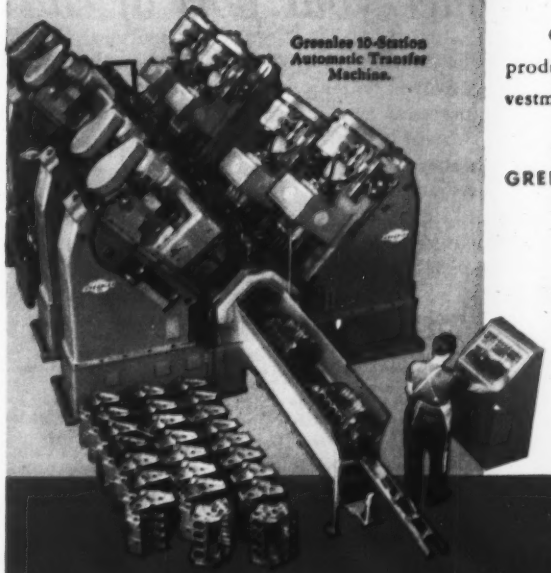
A PROFIT-MAKING INVESTMENT IN HIGH-PRODUCTION MACHINE TOOLS



Greenlee Six-Spindle Automatic Bar Machine.

Greenlee 22-Station Automatic Transfer Machine for machining transmission cases.





Greenlee 10-Station Automatic Transfer Machine.

Greenlee creative thinking, Greenlee engineering and Greenlee experience combined with that of your own engineers will help you "produce more at lower cost."

Ideas, engineering, experience and facilities of Greenlee Bros. & Co. develop improved methods and machines for greater and greater productivity of future models.

Greenlee's adequate facilities expedite the transition from production ideas to production machines . . . a profit-making investment at work in your plant.

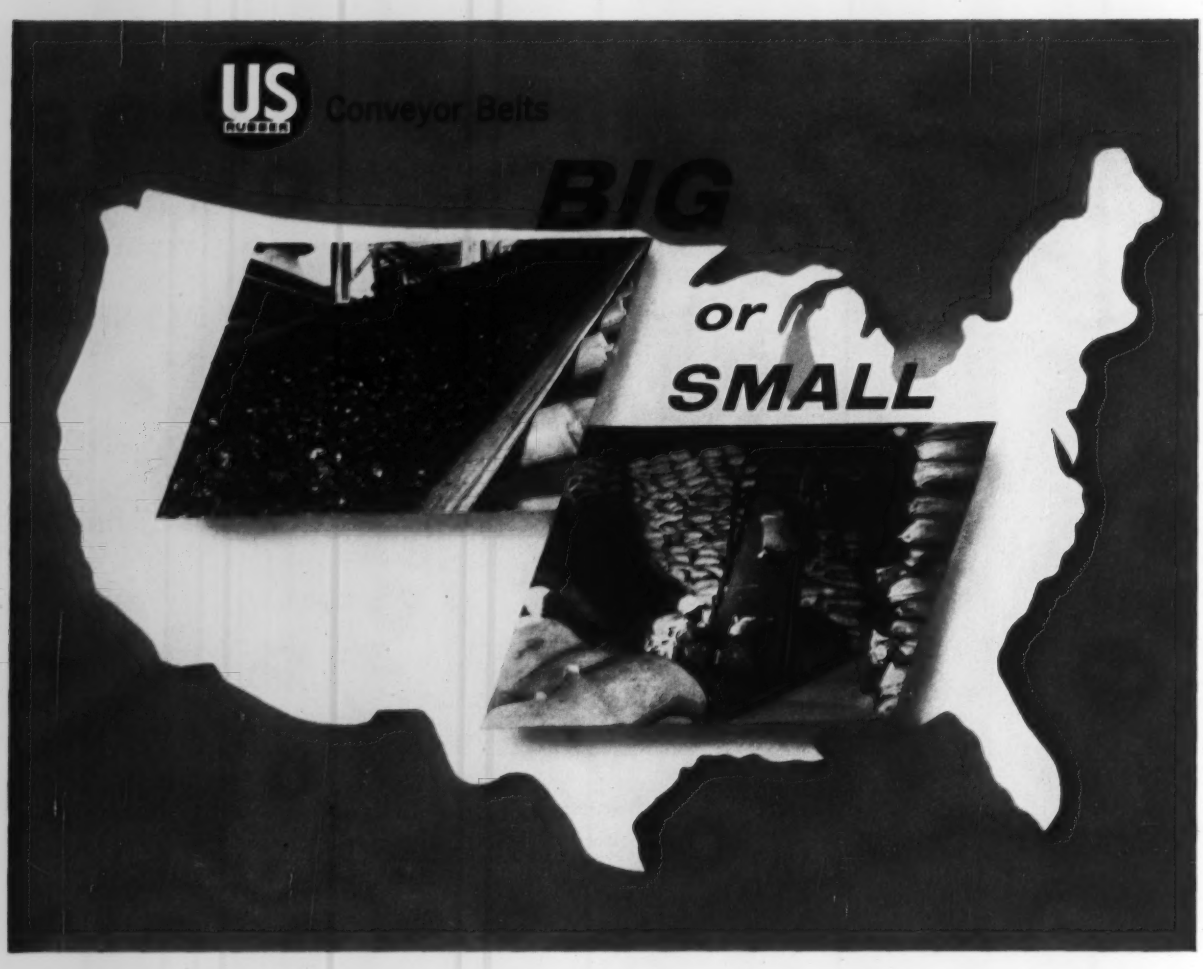
GREENLEE STANDARD AND SPECIAL MACHINE TOOLS

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines

Write for Further Information

GREENLEE

GREENLEE BROS. & CO.
1932 Mason Ave.
Rockford, Illinois



make the nearest "U. S." Sales Office your port of call!

Whatever your conveyor belt needs may be—your convenient "U. S." District Sales Office is your supply point. Here's what it offers:

- The most complete line of belts available
- Fast delivery
- Expert splicing service
- Belt engineering and conveyor design help
- A no-obligation survey of your belting needs

The "U. S." belting engineer will show you the unique "U. S." conveyor belt kit which enables him to build, right before your eyes, a miniature sample of the right type and size of belt to fit your needs.

So whether you're involved with long hauls and heavy loads of ore, oats, or aggregate—or small distances and light weights, such as peas, packages or parts—contact any of the "U. S." offices listed below. Or write us at Rockefeller Center, New York 20, N. Y.

Atlanta, Ga.
999 Lee Street, S.W.

Baltimore 5, Md.
500 N. North Point Road

Boston 6, Mass.
560 Atlantic Avenue

Buffalo 3, N. Y.
133 East Swan Street

Charleston, W. Va.
706 Morris St. at Smith St.

Chicago 32, Ill.
4135 South Pulaski Rd.

Cincinnati 37, Ohio
4921 Para Drive

Cleveland 3, Ohio
7208 Euclid Avenue

Dallas 9, Texas
6125 Pealer Street

Denver, Colo.
4800 Colorado Blvd.

Detroit, Mich.
2121 West Fort Street

Houston 20, Texas
5711 Armour Drive

North Kansas City 16, Mo.
16th and Swift Avenues

Los Angeles 58, Calif.
Soto & E. 46th St.

Milwaukee, Wis.
1314 North Seventh St.

Minneapolis 1, Minn.
400 Second Avenue, N.

New Orleans 25, La.
900 S. Jefferson Davis Parkway

New York 13, N. Y.
191 Hudson Street

Odessa, Texas
912 North Grant Avenue

Oklahoma City 5, Okla.
425 E. Hill St.

Omaha 3, Neb.
4469 Farnam Street

Philadelphia 6, Pa.
5th and Locust Streets

Pittsburgh 12, Pa.
101 Sandusky Street

Portland 9, Ore.
630 N. W. 10th Avenue

St. Louis 2, Mo.
305 South Broadway

Salt Lake City 11, Utah
160 Social Hall Ave.

San Francisco 24, Calif.
6025 Third Street

Tulsa 4, Okla.
1132 South Lewis Avenue

US RUBBER

Mechanical Goods Division

United States Rubber

and plants for the company's continuing expansion program.

NEW ADDRESSES

Rockwell Mfg. Co., Pittsburgh, will move its Dual Parking Meter Division staff to Pittsburgh and manufacturing operations to Rockwell plants at Tulsa, Okla., Russellville, Ky., and Statesboro, Ga.

Luria Steel Supply Co. Inc., steel warehouse, moved to 260 Union St., Catasauqua, Pa. The new property increases the firm's warehousing capacity 300 per cent.

Edgewater Steel Co., Pittsburgh, moved its Chicago district office to 80 E. Jackson Blvd., Chicago 4, Ill. The firm produces wrought steel wheels and tires for the railroad industry.

King Precision Products Corp. moved to its new building at 1024 South Vail, Montebello, Calif. The plant has about 10,000 sq ft of floor space.

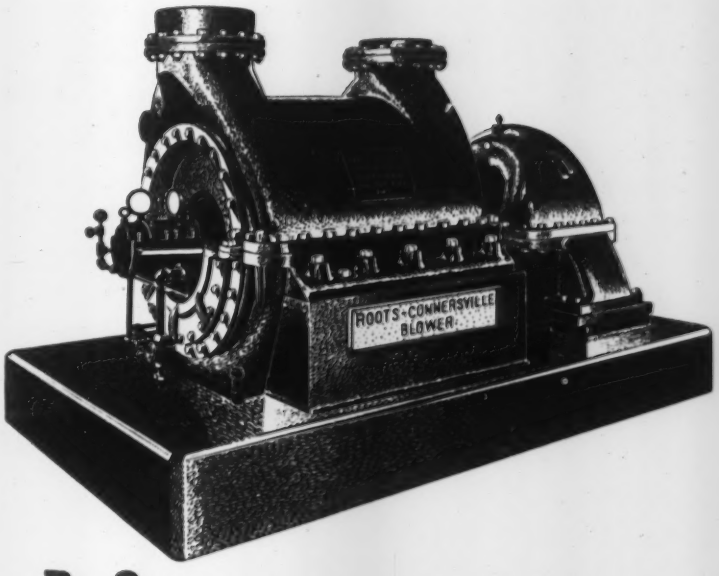
ASSOCIATIONS

Steel Door Institute, Cleveland, re-elected: Chairman, W. F. Scott, Virginia Metal Products Inc., Pittsburgh; vice chairman, Harry Armstrong, American Welding & Mfg. Co., Warren, O.

National Electrical Manufacturers Association, New York, elected these officers: President, A. A. Berard, Ward Leonard Electric Co., Mt. Vernon, N. Y.; vice presidents, N. J. MacDonald, Elizabeth, N. J.; J. J. Mullen Jr., St. Louis; B. C. Neece, New Britain, Conn.; W. V. O'Brien, New York; J. L. Singleton, Milwaukee; treasurer, F. F. Loock, Allen-Bradley Co., Milwaukee.

Investment Casting Institute, Chicago, elected these officers: President, K. W. Thompson, K. W. Thompson Tool Co., New Hyde Park, Long Island, N. Y.; vice president, P. W. Schipper, Howard Foundry Co., Milwaukee; treasurer, V. S. Lazzara, Casting Engineers Inc., Chicago. Executive di-

(*Please turn to page* 136)



R-C centrifugal blowers assure accurate control of volume and pressure

At any speed, Roots-Connersville centrifugal blowers assure uniform delivery of air or gas without the use of receivers. In matching supply to changing demand, this inherent operating advantage simplifies accurate and instantaneous control of volume and pressure.

R-C centrifugals may be direct-connected to high speed electric motors or turbines. Operating speeds may be further raised with speed increasing gears. Occupying a minimum of space and perfectly balanced, with semi-rigid bearing supports to dampen vibration, they do not require special, costly foundations.

Liberal design of diffuser and return passages results in low velocities, normal efficiency even when build-up occurs and exceptionally quiet operation. Operating without internal lubrication, oil-free air is discharged, making it ideally suited for exacting process applications. For complete specification details, write for Bulletin 120-B-14.

Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

1256 Hillside Street, Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.

Finishes to 3 millionths

of an inch...

on these *Carpenter* Stainless parts which keep America's biggest jet bombers flying!

when you want *RESULTS*...

be guided by stainless fabricating performance on interesting jobs like these. Carpenter Stainless parts like these are used in the fuel control systems of America's newest and biggest planes such as the B-52 jet bomber shown at left. Finishes of 3 millionths of an inch are obtained in the machining of many highly critical stainless aircraft parts. In addition, the company who fabricates these parts for the airframe manufacturer is able to hold close tolerances on parts that are irregular in shape. In his own words ". . . we know we can rely on Carpenter Stainless to hold the dimensions to which the parts are designed."

when you want *ACTION*...

on delivery of the Carpenter Stainless you need, simply dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. The man on the order desk is your link with large stocks of Carpenter Free-Machining Stainless Steels, Matched Tool and Die Steels, or Special-Purpose Alloy grades. And large local stocks are backed by Carpenter's nationwide network of Mill-Branch Warehouses. These warehouses are linked by direct, private wire service as further assurance that the specific grade you want is available *when* you want it. Call the Carpenter location nearest your plant for service you can *rely* upon.

Carpenter STEEL

Free-Machining Stainless Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill-Branch Warehouses, Offices and Distributors in Principal U. S. Cities

Ask Standard

how to cut costs with conveyors

Standard limit-switch-controlled Automatic Reciprocator is one of two used to form 200-ft. overhead detour of dehumidifier assembly line.

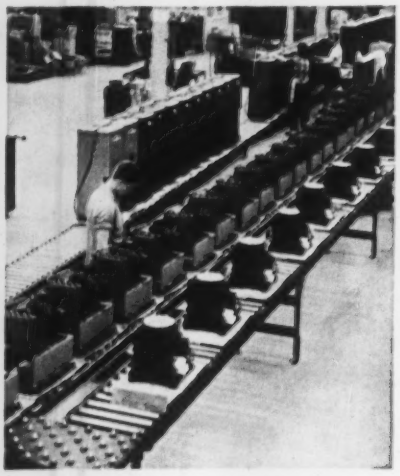
"COMPLETE CONVEYORIZING" . . . what it did in a smaller plant

Products at Ebco stay on conveyors until packaged and sent to shipping.

Ebco Manufacturing Company — employing 275 people to produce water coolers, beverage dispensers and dehumidifiers — has realized substantial savings by completely conveyorizing their operations. Ebco engineers planned for an orderly conveyor system when developing plant layout and building design; consequently conveyor system costs were kept "low" and resulting efficiency is "excellent."

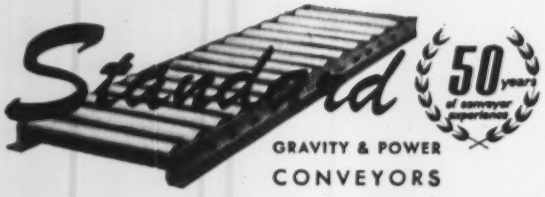
Similarly, it will pay you to take another close look at your present conveyor system. Standard specialists will be pleased to help you make evaluations . . . recommend the proper equipment and its application to meet your specific needs.

STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Gravity roller conveyors like this, used for Ebco's assembly lines, are inexpensive, easy to set up, and economical to maintain.

For details on Standard Conveyors of all types, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin Y-12.



(*Concluded from page* 133)

rector of the institute is Harry P. Dolan.

Conveyor Equipment Manufacturers Association, Washington, elected: President, J. H. Walker, Fairfield Engineering Co., Marion, O.; vice president, A. W. Rich, Fairmont Machinery Co., Fairmont, W. Va.; treasurer, H. E. Murken, Hewitt-Robins Inc., Stamford, Conn.; secretary, J. B. Nordholt Jr., Webster Mfg. Inc., Tiffin, O. R. C. Sollenberger continues as executive vice president.

CONSOLIDATIONS

As of Jan. 1, Youngstown Sheet & Tube Co., Youngstown, will consolidate its **Continental Supply Co.** and **Emsco Mfg. Co.** divisions. The new division will be known as Continental-Emsco Co. with offices in Texas. Fred M. Mayer, president of Continental and vice president of parent firm, will be its president. Continental operates 79 stores which serve the oil industry. Emsco makes a wide variety of oil well drilling and production equipment.

Industrial Enterprises Inc., New York, acquired **Vincennes Steel Corp.,** Vincennes, Ind., subject to approval of Vincennes' stockholders. The Indiana firm fabricates steel for bridges and buildings. It will be operated as the Vincennes Steel Division. The property also can be adapted to manufacture electric traveling cranes for Vincennes' Milwaukee Crane Division.

Vitro Corp. of America is acquiring **Berkshire Chemicals Inc.** Both are New York firms. The new subsidiary will continue its chemical sales business and will handle sales for two Vitro divisions: Vitro Mfg. Co., Pittsburgh, and Vitro Rare Metals Co., Canonsburg, Pa.

Bingham-Herbrand Corp., Toledo, O., has merged with **Van Norman Industries Inc.,** Springfield, Mass.

Sylvania Electric Products Inc., New York, purchased **Argus Cameras Inc.,** Ann Arbor, Mich., effective Jan. 2.

Simple hand assembly of five .209" formed components into a complete housing dramatically demonstrates the precision of stampings produced on By-Products' new press line. No additional finishing or machining is necessary before final fit-up.

Formed to FIT . . . as they come off the line!

OUR VERSATILE NEW PRESS LINE CAN CUT PRODUCTION STEPS FOR YOU!

■ With a new press line for deep drawing and mass producing light gage precision parts—like the units that make up the compressor housing pictured above—*plus* extensive facilities for producing heavy plate shapes, By-Products Steel Co.'s service is now even more flexible, more useful to you!

Today, By-Products can satisfy requirements for precision formed components all the way from sheet gages up into heavier plate thicknesses. Combined with the new press line, more than 150 machines offer you the most complete plate shaping service available.

We've made the investment in equipment and manpower! You pick up the benefits . . . in lower overhead . . . fewer production steps in your shop . . . reduced freight . . . virtually no scrap loss . . . lower production costs.

Get complete details. Write, outlining your interests, to Manager, Marketing Service, 832 Lukens Building, Coatesville, Pennsylvania.

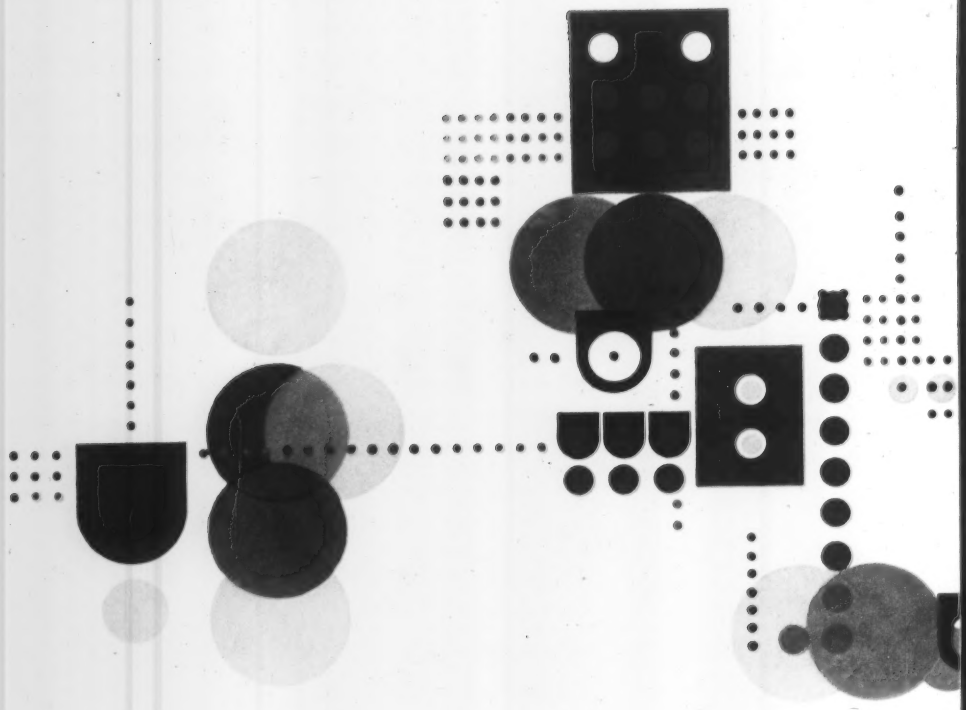
■ **PRESS LINE UNITS**

1. Automatic Loader and Greaser
2. 900 Ton Press
3. Washing Machine
4. Annealing Furnace
5. 600 Ton Press
6. Trimming Press
7. 22 Ton Punching Press
8. 45 Ton Punching Press
9. 150 Ton Punching Press

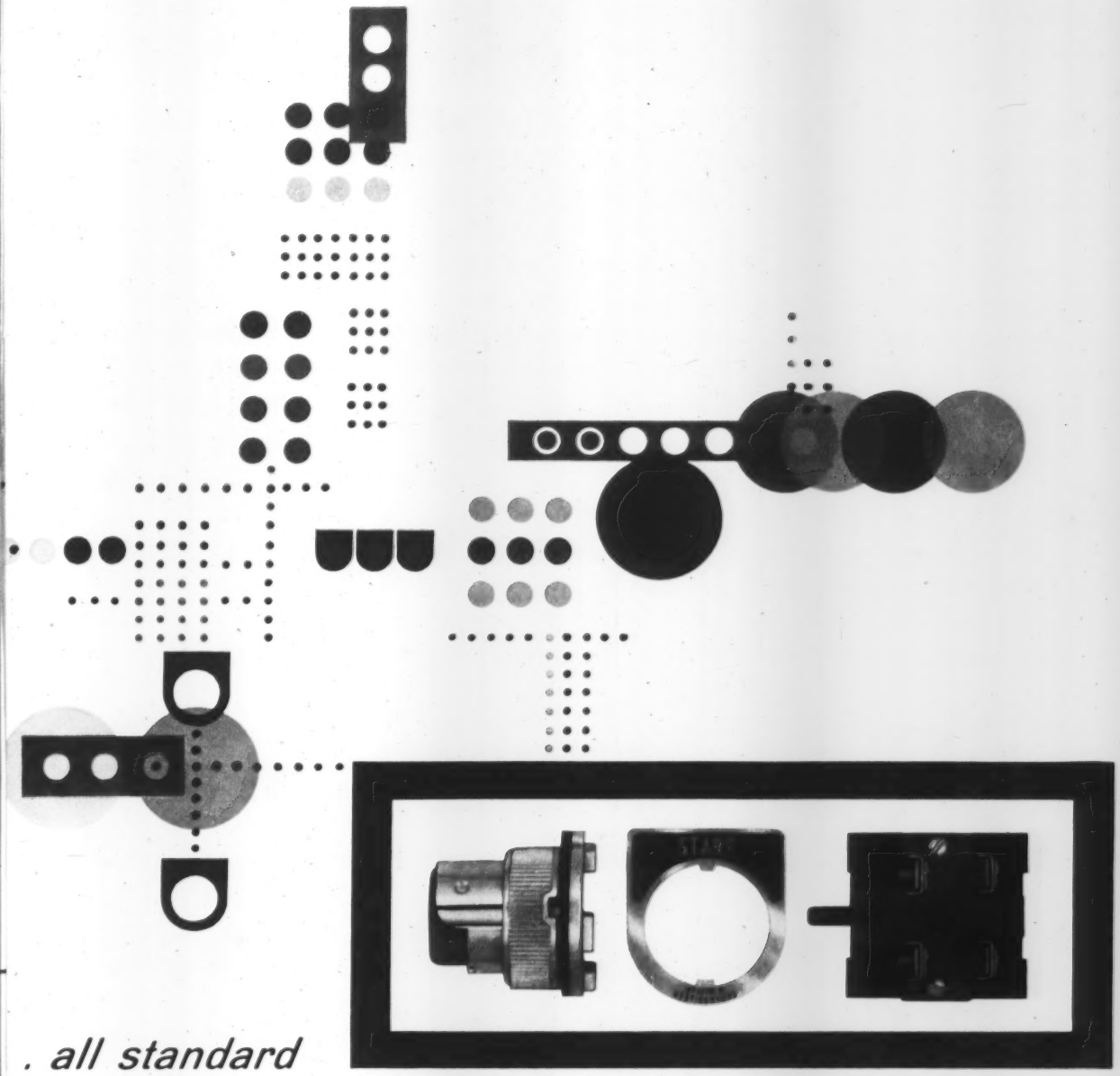
Units are linked by reversible conveyors for fast, economical production.

BY-PRODUCTS STEEL CO. LUKENS

A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



Pushbutton control arrangements almost to infinity . .



. all standard

How'd you like a stock of 1,500,000 pushbutton controls on hand at all times for original equipment needs or for production purposes?

Sound prohibitive space-wise, or too expensive? Not at all. Just 38 Westinghouse components (shown above) do it because all parts are standardized and interchangeable. And always available from stock.

If you need controls for any application, write for the free 72-page *Pushbutton Guide*, B-6749. For control where moisture is a problem, write for free Booklet, B-7022, about Oil-Tite* controls. Write to Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. Or call your Westinghouse Distributor.

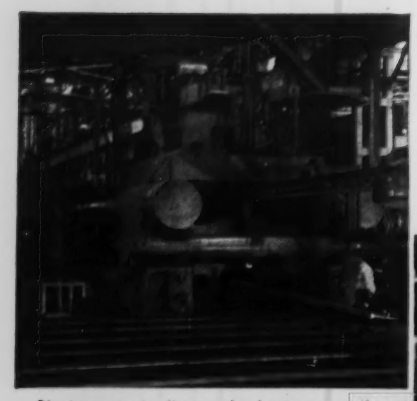
*T. M.

J-30248

YOU CAN BE SURE... IF IT'S

Westinghouse

For the King and Queen of Extrusion Presses . . . it's FIRTH STERLING HOT WORK DIE STEEL



Giant press extruding an aluminum spar section.

2500 lb. die blanks and a finished extrusion die of Firth Sterling HWD Hot Work Die Steel.

At Kaiser Aluminum & Chemical Corporation's Halethorpe Extrusion Works, operated under a U. S. Air Force lease, are two 8,000 ton capacity extrusion presses—the largest operating units designed and built in the United States. Presently extruding large, complex aluminum shapes—wing spars, wing panel sections, and missile hull sections, for the aircraft industry, the two giant presses, named Rex and Regina, utilize dies made from Firth Sterling Hot Work Die Steel.

Yes, Firth Sterling HWD is a monarch in its own right, with properties capable of withstanding the tremendous pressures of this king and queen of extrusion presses. This intricate process requires materials that can operate continuously in volume production without replacement. These giant presses each weigh 1500 tons and are capable of extruding aluminum shapes more than 85 feet long and over 1200 pounds each in weight. The use of Firth Sterling HWD is tangible evidence of the high opinion modern die makers have of the quality of the material.

HWD Steel is just one of the Firth Sterling line of more than 50 Tool and Die Steels. Ask for a Firth Sterling engineer to cooperate in your next die making problem to assure the correct grade and analysis.

R-326

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS McKEESPORT, TRAFFORD, DETROIT, HOUSTON, HARTFORD

OFFICES AND WAREHOUSES: BIRMINGHAM CHICAGO CLEVELAND DAYTON DETROIT HARTFORD HOUSTON LOS ANGELES PITTSBURGH WESTFIELD, N.J.

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium

Technical Outlook

BRITTLE FRACTURE— The testing of parachutes and the notch toughness of steel have something in common, M. W. Lightner and R. W. Vanderbeck of U.S. Steel Corp. told the AISI in Pittsburgh. In both cases, the test that counts is performance in service. In discussing the role of the notch in brittle fracture, they emphasized that notch toughness problems do not lie solely with the material. Design and method of fabrication play a big role.

COMMINUTION— That's what mineral engineers call the making of little chunks out of big ones, and it poses a problem with ores. The ideal, from a separation point of view, would be to end up with unfractured single grains. Engineers at MIT are seeking to improve methods of mechanical and chemical ore separation that will yield a maximum number of single grains.

FIFTH WHEELING— Not long ago A. O. Smith Corp., Milwaukee, took a hard look at the fifth wheel on the tractor-trailer and replaced its springs (a frequent cause of complaint) with Neoprene rings. The next step is a fifth wheel that will be an integral part of the tractor's rear axle. One benefit: Lower tractors.

SHAKES— If you're looking for something different in lapping machinery, Syntron Co., Homer, Pa., has one that does it with vibration. It uses an abrasive cloth to polish parts like metallurgical samples or sealing ring bases. Finish: 1 or 2 microinches rms.

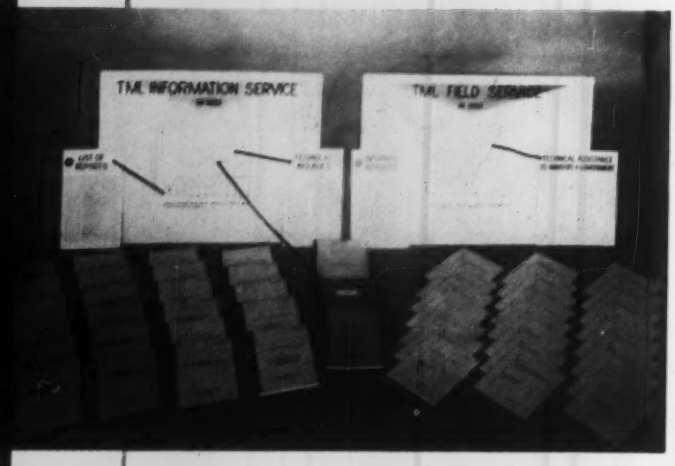
CARD CONTROLS A LATHE— Tests on a multicycle lathe show that card controls have cut setup time on many jobs by 80 per cent. Engineers at Sundstrand Machine Tool Co., Rockford, Ill., have applied a GE numerical positioning control to their new model 14 single-point production lathe. Control cards are punched directly from process drawings. Rapid change-over, a must on short-run jobs, takes only the time needed to change a deck of cards. Reports are that one man can run as many as five of the machines efficiently. With this type control, the lathe has a range of eight spindle speeds and is capable of roughing or finishing.

FIREPROOFING— Asbestos sprayed on structural steel members and steel floors has been tested by the Underwriters' Laboratories as a fire retardant. Results were favorable. A copy of the report can be obtained from Keasbey & Mattison Co., Ambler, Pa., which distributes Limpet, the asbestos fireproofing medium. The composition is applied to any surface simply by blowing it under pressure through a special spraying machine.

HEAVY WATER REACTOR— The Atomic Energy Commission has asked the Du Pont Co. to study the feasibility and economics of using heavy water moderated reactors for electric power generation. Particular attention will be given to the use of natural uranium as a fuel.

CHEAPER ZIRCONIUM— Commercial grade zirconium can be produced to sell for $3.50 per pound with a new sodium reduction process, predicts U.S. Industrial Chemicals Co., a division of National Distillers Products Corp., New York. Present price is around $10. Hafnium-free zirconium, required for atomic reactors, will also be much cheaper, says the company, if an Australian process for separating hafnium from zirconium chloride works out. The company's zirconium plant is being built in Ashtabula, O.

Metalworking Outlook—p. 91 *Market Outlook—p. 203*



These are some of TML's products

Headquarters for Titanium Facts

EARLY in 1955, the Defense department established the Titanium Metallurgical Laboratory (TML) to speed the development of the metal and its introduction into weapons.

TML is operated under an Air Force contract by Battelle Memorial Institute, Columbus, O. Its purpose: To collect, store and disseminate technical information on titanium and to assist in research, development and application.

The big effort is the dissemination of information. Formal technical reports are mailed to key engineers and managers in over 400 companies. You can get them from the Office of Technical Services of the Department of Commerce.

Formal reports are supplemented by brief memorandums on titanium technology. They are mailed to persons interested in some specific phase.

We're Ready for Volume Business,

Here's a progress report on who's doing it and how—also what you can expect and some information about Battelle's government sponsored laboratory that's devoted entirely to titanium research

BY 1960, experts predict, airplane makers will use nearly 5000 tons of titanium extrusions yearly.

Except for jet engines, few are in today's aircraft, although airframe makers say they could use 135 tons now if they were available.

Who's Who—Some 12 American firms are in the business (see below). They have conducted extensive experimental programs to kill the bugs and get into production. About seven are open for business.

The pace at which hot titanium extrusions will move ahead depends on the designer. Growth is tied in with original designs. As substitutions, extrusions have a potential of only 10 or 15 per

What extruders are doing

Company	Alloys Extruded	Process	Type of Work
Babcock & Wilcox Co. Tubular Products Division, Beaver Falls, Pa.	Commercially Pure Ti Ti-6Al-4V Ti-3Al-5Cr Ti-5Al-2.5Sn Ti-5Al-2.75Cr-1.25Fe	Glass	Tubes, engine shapes
Bridgeport Brass Co. Aluminum Division, Adrian, Mich.	Commercially Pure Ti Ti-4Al-4Mn Ti-3Al-5Cr Ti-6Al-4V	Glass	Experimental
Canton Drop Forge & Mfg. Co., Canton, O.		Grease	Rounds, tubes and shapes on conversion basis

TML Report No. 53, by A. M. Sabroff and P. D. Frost of Battelle's Light Metals Division is recent in the series. This article is based on it.

Technical data are sent in response to inquiries. In addition, qualified persons can use the technical files.

Such information is provided by a staff of more than 30 engineering specialists, which is backed up by a unique and extensive file of information. A rapid-access, multiple-entry file (see illustration) holds data condensed from almost 20,000 documents (originals are filed at TML).

You can get special assistance from TML. It can provide engineering services and laboratory investigations for producers, fabricators and users of titanium.

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Here is TML's master index on titanium

Say Extruders of Titanium

cent of the total amount of titanium used in airframes. Planning at the drafting table can easily double that figure.

Why Extrusion—The cost of titanium highlights the economy of extrusions which eliminate or greatly reduce machining waste. First used for simple gas turbine parts like spacers and rings, hot extrusions will be found in tomorrow's airframes as well.

Titanium also fits the versatile pattern of extrusions—you can fabricate nonuniform, unsymmetrical sections with compound curves and sharp corners. Parts can be hollow or solid.

Developments—As of June this year, Babcock & Wilcox Co. extruded more than 20,000 lb of heavy walled tubes, most of which went into ordnance. A few engine shapes have been produced.

B&W's equipment was designed for steel. It includes a 500-ton vertical piercing press and a 2500-ton extrusion press.

Bridgeport Brass extrudes titanium experimentally, as does Chase Brass & Copper, H. M. Harper and U.S. Steel.

King Size—Perhaps the most widely publicized press is the 12,000-ton Loewy at Curtiss-Wright. So far most of its work has been heavy walled Ti-6Al-4V, tubes although some Ti-5Al 2.5Sn

Company	Alloys Extruded	Process	Type of Work
Chase Brass & Copper Co., Waterbury, Conn.	Commercially Pure Ti Ti-8Mn Ti-4Al-4Mn Ti-3Al-5Cr Ti-5Al-2.75Cr-1.25Fe Ti-3Mn-complex Ti-2.7Cr-1.3Fe-0.25O Ti-6Al-4V	Copper jacket	Rounds, tubes, structural shapes
Curtiss-Wright Corp. Metals Processing Division, Buffalo	Commercially Pure Ti Ti-6Al-4V Ti-5Al-2.5Sn Ti-4Al-4Mn Ti-2.2Fe-2.1Cr-2Mo	Grease	Tubes, engine shapes
H. M. Harper Co. Morton Grove, Ill.	Commercially Pure Ti Ti-4Al-4Mn Ti-6Al-4V	Glass	Experimental

What extruders of doing

Company	Alloys Extruded	Process	Type of Work
Harvey Machine Co. Harvey Aluminum Division, Torrance, Calif.	Commercially Pure Ti Ti-4Al-4Mn Ti-3Al-5Cr Ti-6Al-4V Ti-5Al-2.5Sn Ti-3Mn-complex Ti-2.2Fe-2.1Cr-2Mo Ti-7Al-3Mo Ti-3Mn-1.5Al Ti-4Al-4V	Grease	Airframe structural shapes, rounds
International Nickel Co. Huntington, W. Va.	Commercially Pure Ti Ti-4Al-4Mn Ti-3Al-5Cr Ti-2.2Fe-2.1Cr-2Mo Ti2.7Cr-1.3Fe-0.25O Ti-5Cr-5Fe-5Mo	Glass or Grease	Rounds, tubes on conversion basis

tubes have been made. The direction of this program is toward engine rings, and rotor shafts that can be extruded from full size ingots. A little work is being done on hollow propeller blades.

Harvey Machine produces some structural sections for aircraft firms on a 1650-ton press equipped with containers 5 and 6 in. in diameter. It can use an extrusion ratio of 65 to 1, although 40 to 1 is about the limit.

Jones & Laughlin is a recent entrant. Its program is aimed at shapes which are subsequently cold drawn to improve surface finish. The company feels that the system will produce the finishes and close tolerance needed for airframe structural shapes.

Reynolds Metals Co. has concentrated its program on the airframe maker's greatest demand: Thin walled structural shapes.

Current Practice

Most firms employ the forward extrusion method with horizontal hydraulic presses. Billets are placed in a circular chamber (container) and forced through an open die at one end. Metal movement through the die is in the direction of the ram movement.

The exception is the backward extrusion of short, heavy-walled tubes in vertical hydraulic presses. The metal flows back over the piercing mandrel.

Temperature—When all other variables are stabilized, extrusion force is inversely proportional to temperature and directly proportional to extrusion ratio. If the extrusion ratio is constant, extrusion speed is a function of temperature alone, so current practice is to extrude at higher temperatures.

For commercially pure titanium that may reach 1900°F, which is well into the beta-phase region, it's practicable to extrude at 1700°F. The extrusion temperature of alloys is more critical because of its effects on beta transformation. Generally, the alpha-beta alloys lose ductility when they are heated in the beta-phase region.

In some instances, annealing or heat treating after extrusion will restore sufficient ductility for low strength applications. To be useful, extrusions must meet strength requirements of 150,000 to 170,000 psi, yet retain adequate ductility.

Heat-treatable, commercial alloys must be extruded at temperatures in the alpha-beta range well below the beta transus.

Lubricants—Because of the severe galling characteristics of titanium, lubrication is probably the most difficult problem for the extruder. Ineffective lubrication produces an unsatisfactory surface finish which is deeply scored and torn. The cost of die maintenance often becomes prohibitive.

There are two basic types of lubricants: Greases and glass. A third type, metallic copper coatings, is used less extensively. Each has its characteristic surface quality and tolerance limitation.

Grease-Solids—These are most suitable for shapes with high quality surface finishes and close tolerances. Examples: Airframe structural parts which require little or no finishing. Today's lubricants permit a maximum length of about 10 or 15 ft.

Most hot-working lubricants are a mixture of grease or oil and graphite. Additives, such as molybdenum disulphide, mica, talc, soapstone and asphalt, are also used with graphite. Powdered aluminum is a successful additive to grease lubricants.

The more common greases are made with oils and a gelling agent (usually a soap of calcium, lithium, aluminum or sodium). Another gelling additive is a nonsoap derivative of bentonite clay (National Lead Co.'s Bentone).

Recommended—Battelle Memorial Institute, working with Fiske Bros. Refining Co., Toledo, O., developed and evaluated a number of experimental extrusion lubricants. Here are the compositions:

1. Calcium-base grease, plus 35 per cent graphite and 5 per cent mica.
2. Calcium-base grease, plus 25 per cent MoS_2 and 5 per cent mica.
3. Calcium-base grease, plus 25 per cent graphite, 15 per cent MoS_2 and 5 per cent mica.

Company	Alloys Extruded	Process	Type of Work
Jones & Laughlin Steel Corp. Pittsburgh		Glass	Experimental
Reynolds Metals Co. Phoenix, Ariz.	Commercially Pure Ti Ti-4Al-4Mn Ti-3Al-5Cr Ti-6Al-4V Ti-5Al-2.5Sn Ti-3Mn-complex	Grease	Rounds, tubes, engine shapes, airframe structural shapes
Titanium Metals Corp. of America, Watervliet, N. Y.	Commercially Pure Ti Ti-2.2Fe-2.1Cr-2Mo Ti-6Al-4V	Glass	Rounds, tubes, engine shapes
United States Steel Corp. National Tube Division, Gary, Ind.		Glass	Experimental

4. Bentone grease, plus 25 per cent graphite, 15 per cent MoS_2 and 5 per cent mica.

The mixtures containing both graphite and molybdenum disulphide were more effective than those containing only one solid additive. Bentone was superior to the calcium-base grease.

Most extruders and lubricant manufacturers agree with Battelle's TML that solids must comprise about 50 per cent of the grease mixture by weight. The consistency of a grease depends on the viscosity of oil and the amount of gelling additive, and is controlled in this way, except for asphaltic-base block greases.

Opinion is that a medium consistency is most suitable (National Lubricating Grease Institute Grade 2). Lighter mixtures become too fluid on contact with the hot surfaces and won't stay on the tools. Heavier mixtures are difficult to apply evenly. Battelle, Harvey and Reynolds stress the importance of lubricant consistency.

Block greases can be melted onto a hot die surface by direct contact. Application of the grease to the press container is more difficult. The grease may be plasticized by solvents or heat to facilitate swabbing.

It's generally accepted that the industry needs a grease lubricant with good insulating and high-temperature properties.

Glass Extrusion—The use of glass as an extrusion lubricant is often called the Ugine-Sejournet process. Here's how it operates:

Billets are transferred from the heating furnace to the charging table of the extrusion press. As a billet rolls into position in front of the container, it passes over a sheet of glass fiber, or a layer of glass powder, which fuses to the billet surface. A fibrous glass pad is placed in front of the die providing a reservoir of glass at the die face during extrusion. In making tubes, a fibrous glass sock is placed over the mandrel, or powdered glass is sprinkled on the inside surface of the hollow billet.

Protection—Glass is also a good insulator which protects the tools during extrusion. Although the surface finish is not as good as that of parts made with grease lubricants, longer lengths can be extruded, upping the production rate.

What glass you select depends on extrusion temperature and the type of bond between the glass and metal. It must have a sufficiently high softening point, a melting range which matches the extrusion temperature and adequate viscosity. Certain glasses react with the metal to produce a chemical bond, while others form a mechanical bond.

With the present techniques and glasses, rigid surface finish and tolerance requirements cannot be achieved.

Copper Coatings—Copper and aluminum are often employed as coatings. Copper jacketing was one of the early methods. At present, only Chase Brass uses it.

Both solid and hollow billets must be completely jacketed and sealed. To avoid tearing the jacket, the front end of the billet must have rounded edges.

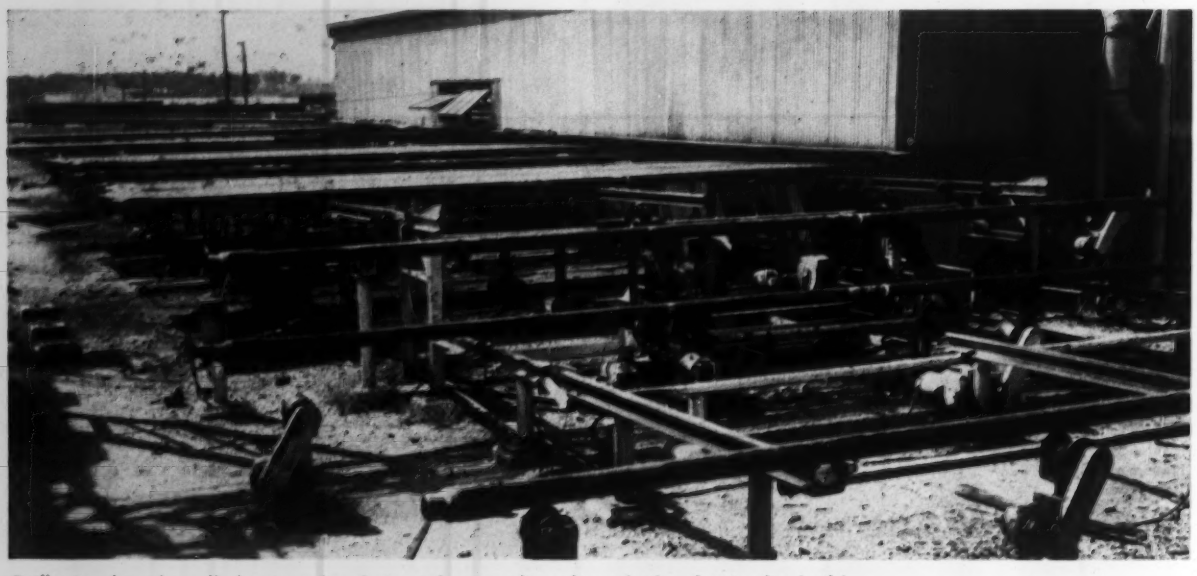
Thickness of the copper jacket has a marked effect on surface finish: Too great a thickness wrinkles the titanium surface.

Roughness—According to Chase Brass, a more important factor is the condition of the billet. Roughness of the extrusion is approximately proportional to the grain size of the billet. As-cast billets are not as suitable as forged billets with this technique. You can avoid copper contamination by placing a thin layer of steel between the billet and jacket.

A lubricant generally is used with the copper jacket. Chase likes block grease or a tallow-graphite mixture. Lubricant is applied to the die, the container and (for tubes) to the mandrel.

Chase uses copper jackets for the extrusion of round tubes. Inside surfaces are normally smooth while outside surfaces are ground.

• *An extra copy of this article, and Part II which appears next week, is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Drill pipe lengths roll down racks, their ends extending through the slot in the building. At center, elevators boost pipes to high end of the rack

Automation Handles 30-Ft Parts

Designed and built by the user, this installation moves drill pipe through a flash welding sequence. Climate in Texas helped to lower costs

PLAGUED by handling problems that went with 30-ft workpieces, production engineers at Reed Roller Bit Co., Houston, rebuilt their flash welding plant around a homemade automation scheme.

The installation is designed to weld tool joints (working connections) to drill pipes (2⅞ through 5½-in.) which weigh as much as 600 lb.

Design Factors—Layout of the installation was influenced by two prime factors, in addition to workpiece size and shape. First, only the ends of the pipe are worked on. Second, the temperate Texas climate was a cost cutter: Much of the installation could be built outdoors.

Ends of the pipe are passed through the building walls. Work is done inside the 66 x 80-ft building, but the conveying equipment is outside.

Pipe is unloaded from the freight cars or trucks and put on storage racks by an overhead traveling crane. When it is to be processed, it is moved adjacent to production racks. From this point, automatic handling equipment takes over.

Steps—Here are the manufacturing steps:

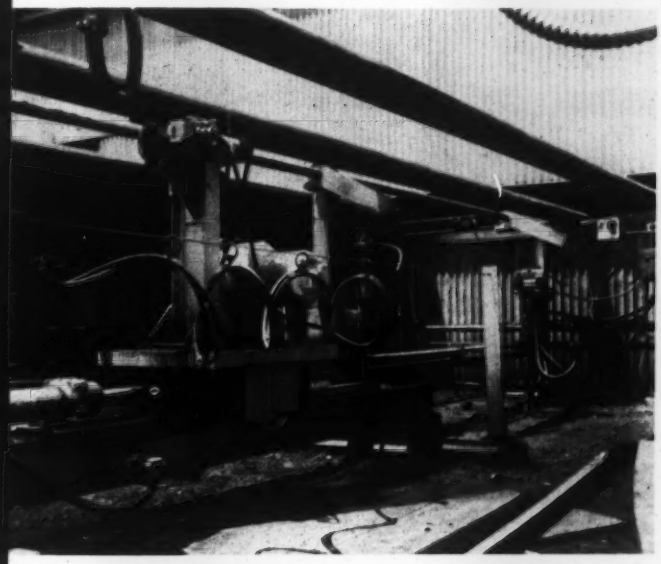
1. Clean pipe ends.
2. Controlled preheating.
3. Welding.
4. Slag removal from inside diameter.
5. Controlled cooling.
6. Draw welded area.
7. Controlled cooling.
8. Reverse pipe and move it to other side of building.
9. Turn off and bore out welding flash.
10. Magnaflux inspection.
11. Dimensional and concentricity inspections.
12. Paint and grease.

The pipe makes two passes around the building—one for each end. Through most of these steps, the pipe moves laterally, rolling down a series of inclined racks. It is boosted by elevators from the lower end of one rack to the upper end of the next.

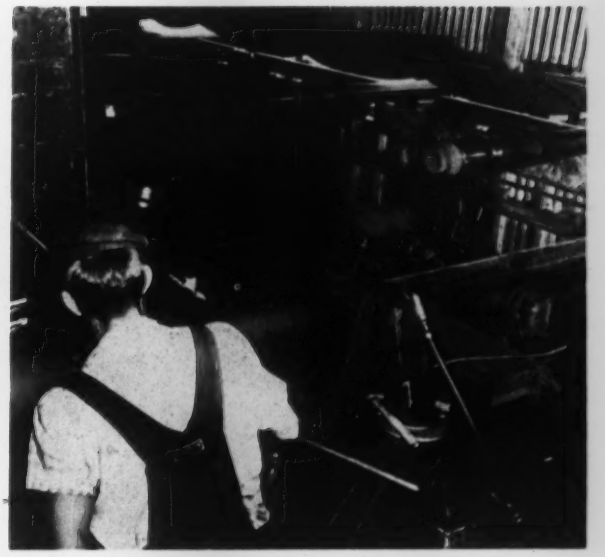
Timing — Each station in the sequence must receive pipe when needed, and discharge finished work independently of the other machines or stations. At these work stations, powered roller mechanisms raise each pipe clear of the racks, and move it a few feet into the building to be worked. When the operation is completed, these rollers return it outside and release it.

Since material must not miss an operation, pairs of limit switches control pipe flow to the station.

Example — The shotblast unit cleans pipe ends. When enough pipe accumulates at this station to depress two switches simultane-



This car picks up pipes and carries them a few feet into the building where ends are blast cleaned



Lathe operator pushes a button to bring pipe ends between chuck jaws. He clamps them and turns off weld flash

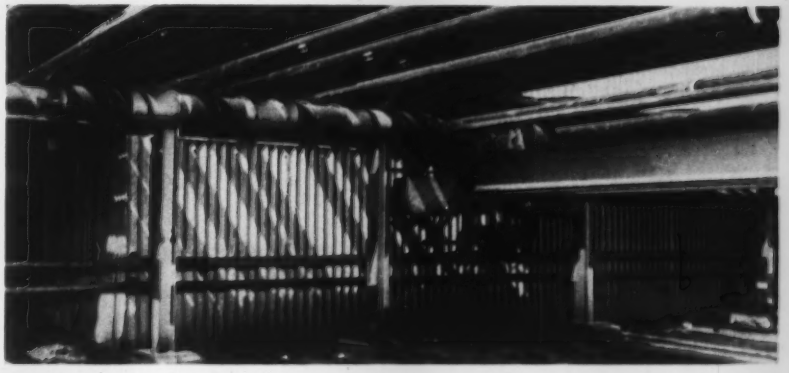
ously, power to the mechanism is cut off and movement to the station is halted. When the work station has processed enough pieces to clear the first limit switch, the mechanism resumes operation.

The first seven operations are done as the pipe passes along one side of the building. The building has slotted sides which permit the ends of the pipe to move inside the walls, while the other 25 ft or so are outside.

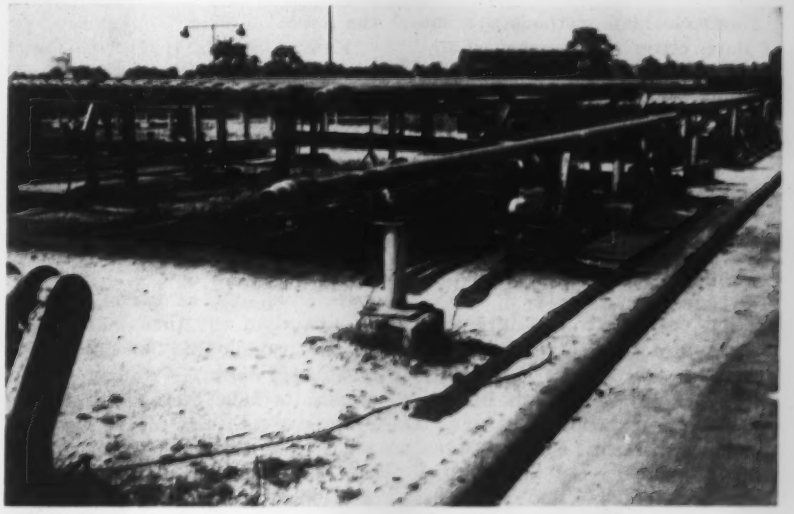
At the end of the production sequence on the first side of the building, an elevator lifts and turns the part 180 degrees. Pipe then passes on powered rollers to the other side of the building.

Two Passes—Since joints at opposite ends of the pipe are different (male and female), one end of all pipe in a lot is finished before the equipment is set up for welding the other end. So the automatic handling equipment is set to accumulate pipe on a storage rack until this change in setup is made. Then it is moved back on the moving tracks and completed.

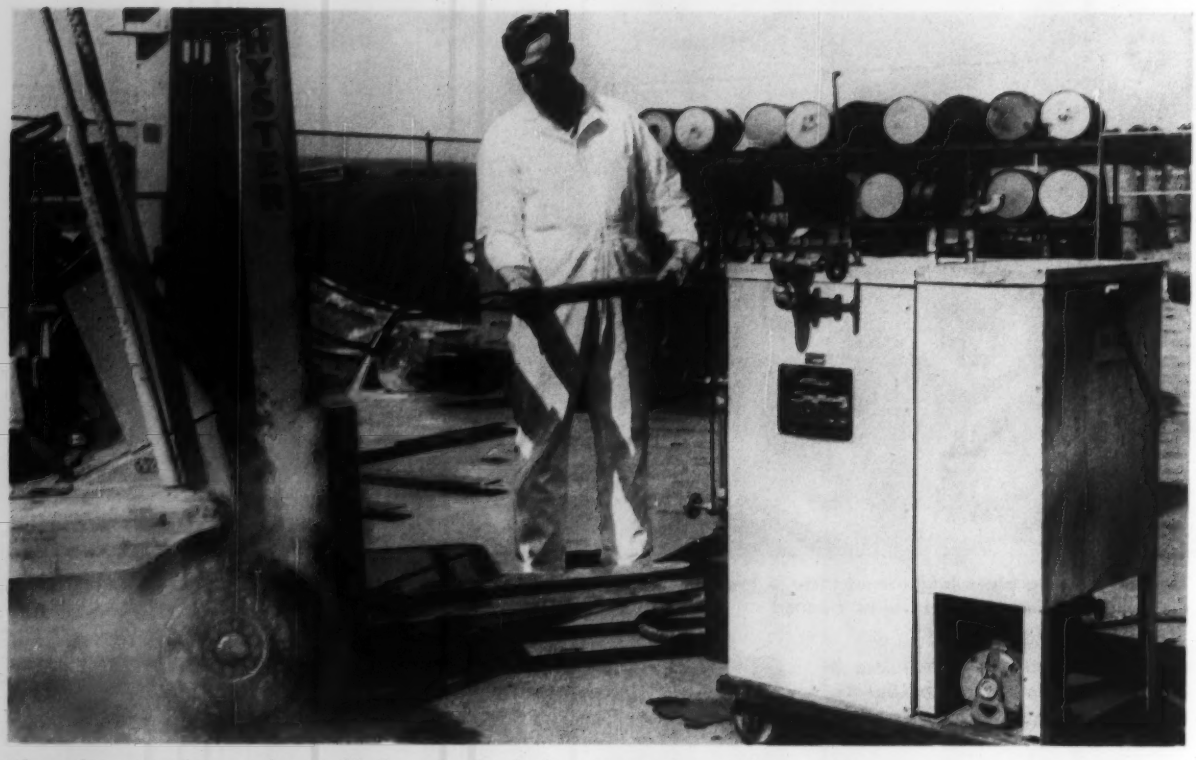
The pipe is moved along the ends of the building (to the initial elevating equipment or to the opposite end where it is reversed). The material is handled by individually powered rollers mounted on stands of uniform height. Every other motor is powered, driven by a small electric motor.



Spiraled bar is welded to this drum. Its screw action controls the rate of travel. It follows a heating stage and maintains a uniform cooling rate



This lot of pipe has joints finished on one end. Other ends will be finished after pipes are passed back to the starting position on these pedestal rolls



Lift trucks can pick up a lot of dirt from the loads they carry. Steam cleaning is quick, increases mechanical life of slides and bearings

How Steam Cleaning Speeds Maintenance

IF you think your maintenance costs are too high, take a look at the way your cleanup crew operates.

Hand cleaning methods are out of date, claim maintenance equipment makers. Here are some advantages of steam cleaning:

1. It removes heavy oil and grease quickly and cheaply.
2. It cleans better than any hand method.
3. It makes an unpleasant job relatively simple.

Long View—Managers scan indirect labor costs as closely as production costs. They realize that cleaning heavy machinery is a time waster.

Here is an example of how to cut cleaning expense.

Kaman Aircraft Corp., Bloomfield, Conn., wanted mechanized maintenance equipment. Its maintenance crew now has wet-and-dry vacuum cleaners, floor polishers, a platform truck with a winch, a dump truck and a station wagon. A steam cleaner made by Pantex Mfg. Corp., Pawtucket, R. I., is the latest addition.

Kaman steam cleans machine tools that are to be rebuilt or repainted, some of which are especially difficult to clean. Grinding machines are tough since abrasives, metal particles and coolants coat the machine with accumulations which are tough to remove. Lathes are relatively easy to clean. The dirtiest of machines, Kaman has found, can be steam cleaned in less than the time needed for hand scraping and brushing.

Storage Help — Kaman steam cleans its helicopters, too. When they are returned for service, or when they are taken from storage and prepared for delivery, steam speeds up the cleaning job. It removes accumulated dirt and grease or the thick rust preventives which protect engines and struts.

The aircraft firm also keeps concrete floors free of dust and dirt that might affect the accuracy of the precision operations. Once a year, all floors are thoroughly cleaned and resealed. Ordinary cleaning and sweeping can then maintain floors satisfactorily.

Kaman expects to use steam on the production line to prepare aircraft sheet metal for painting.

Production Tool — Other companies like steam cleaning as a technique for production. One electrical manufacturer cleans soldering flux off conduit leads.

Steam cleaning is a time saver for steam hammers and hydraulic forging presses. One firm cleans its forging machines with practically no dismantling. Hammers and presses are brushed or sprayed with detergent and allowed to soak for 15 to 20 minutes before rinsing with dry steam.

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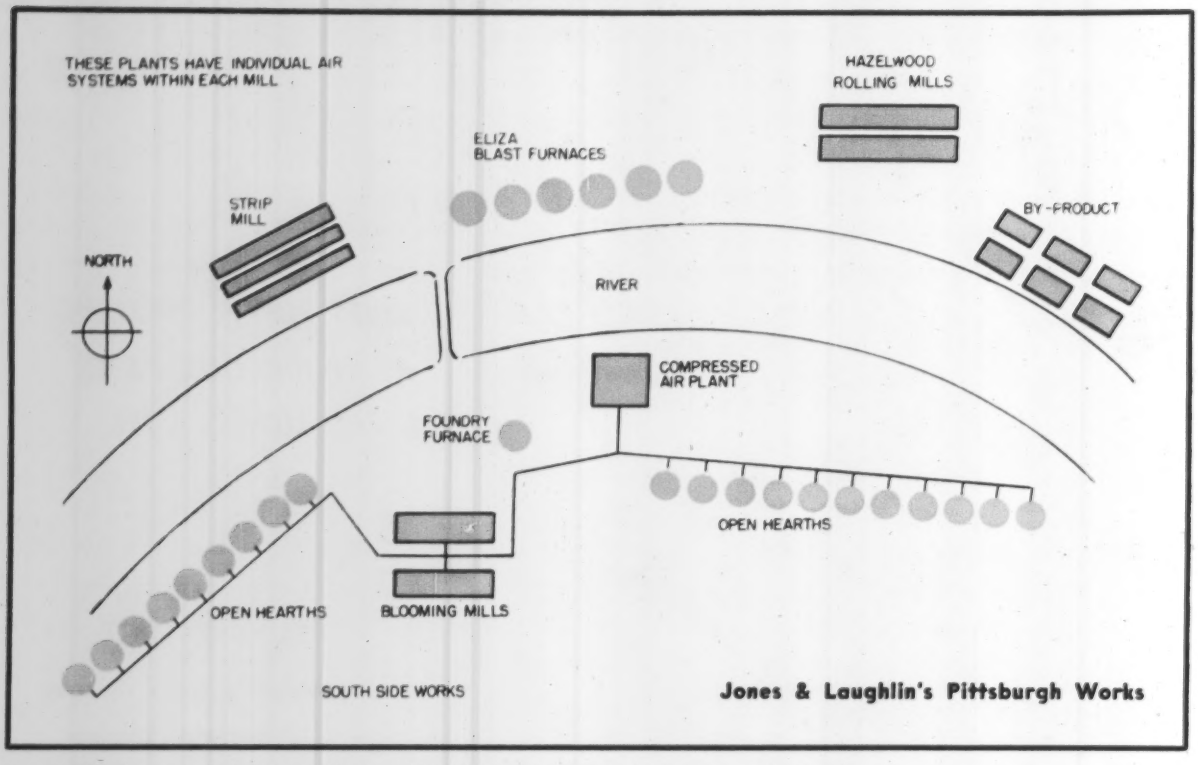

Here's the layout of the Jones & Laughlin Pittsburgh Works. Plants on the north side have their own air systems

J&L's Air System

When even minor breakdowns can cause expensive loss of steel production, it's important for systems to have proper design, operation and maintenance. Here's how it's done at the Pittsburgh Works

IT takes over 1¼-million cu ft of air to make a ton of steel at the Pittsburgh Works of the Jones & Laughlin Steel Corp.

Multiply that by its daily steel ingot capacity (around 8000 tons) and you'll get a rough idea of what it takes to design, operate and maintain the gigantic compressed air systems steelmakers need.

Here are seven basic rules J&L engineers follow:

Design — 1. Make pipe large enough. The pressure drop between the receiver and point of use must not exceed 10 per cent.

2. Use a loop system in each shop or building when possible. A two-distribution system works better at points of heavy use.

3. Locate liberally sized receivers at the far ends of long distribution lines and at points of heavy use.

4. Put headers or mains close to the point of use. They cut down hose length, avoid large pressure drops.

5. Place outlets near the top of pipelines. They prevent carryover of condensate.

6. Slope piping toward a drop leg or moisture trap, located away from the compressor.

7. Make the system oversize and allow for expansion.

Map—J&L's air distribution system is shown in the illustration. Separate facilities serve the five mills on the north side of the river; air for the south side plant comes from one compressor station.

Four rotary compressors supply the blast furnace: Three are driven by 400-hp motors, one by steam. They produce 1200 to 1800 cfm at 40 to 115 psi.

Air is discharged through an 8-in. pipe. Plant engineers think that size is the most practical.

Two aftercoolers and two air re-

THE OTHER TURN

IF THE ENGINEERS ADD ANY MORE INSTRUMENTS THEY'RE GON'NA HAVE OLD PETE TALKIN TO HIS SELF!
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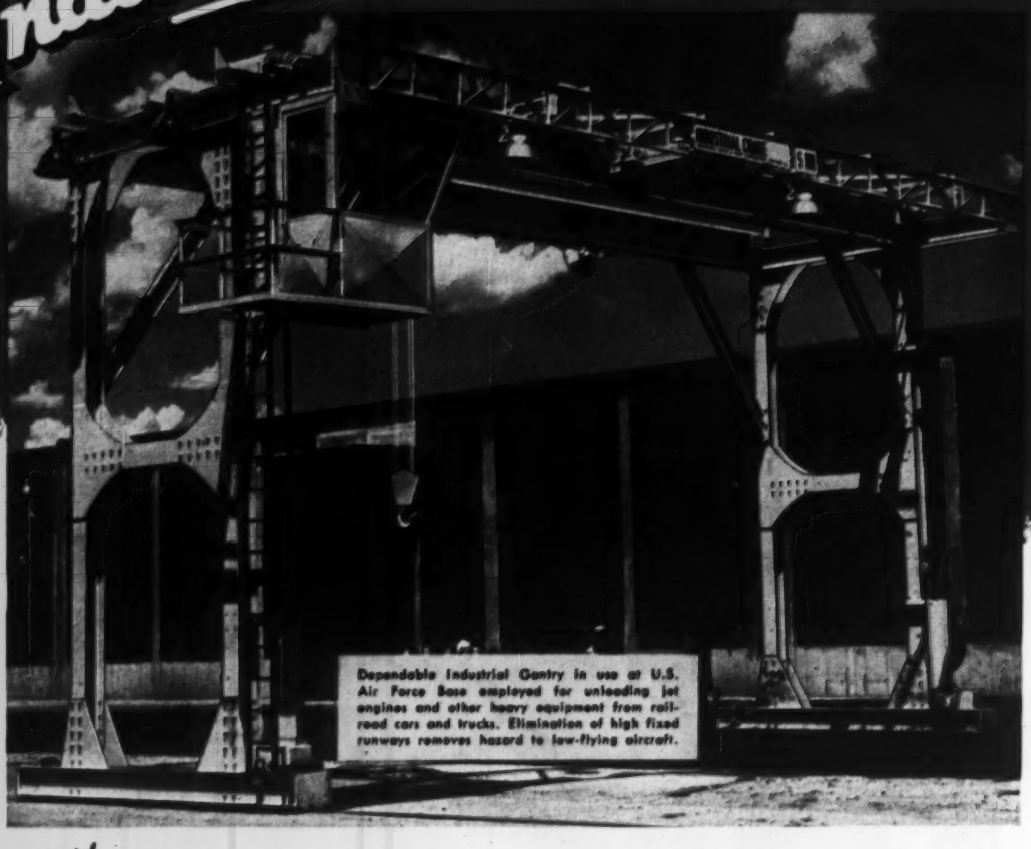
Industrial GANTRYS CUT HANDLING COSTS



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ceivers are in the distribution system. A pressure reducing valve lowers the pressure to 40 lb for ore bin doors and larry car cleaning. For general plant use, a 100-lb line supplies boiler controls, painting, foundry chipping, tamping and cleaning, ladle dumping and cleaning, furnace notching and tapping, construction tools and hoists, railroad switching and car brake testing.

Blast Furnaces — Four centrifugal compressors are used in the Eliza mill (see illustration). Two put out 100,000 cfm at 30 pounds per square inch at gage (psig); the others, 60,000 psig.

Henry Bickel, operations and maintenance supervisor at Eliza, says that they are high speed machines, good for large capacity requirements.

Open Hearth—At the south side plant of the Pittsburgh Works, 20 open hearths, ranging from 50 to 275 tons, produce about 275,000 tons of steel a month. Compressors are in a building next to them. Air lines are 15 to 30 ft above ground to make them more accessible for repair.

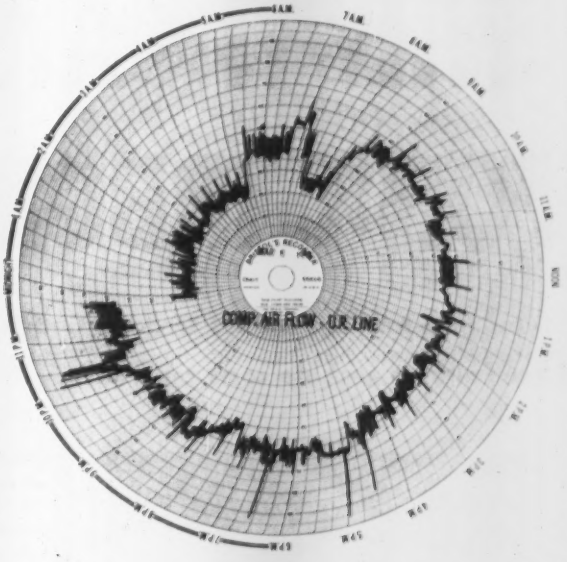
Three reciprocating compressors supply 1880 to 3800 cfm at 100 psi. Three 12-in. mains take it through three aftercoolers and two air receivers before entering the mill at 90 psig.

Protection—A unique feature is a steam smother system at the compressors. It's protection against overheated air in the lines, a fire hazard. A temperature control valve admits steam and shuts down the compressor if the air gets too hot.

Three reciprocating compressors are used in the strip mill. Two are 600-hp units operating at 2750 cfm and 110 psi; one delivers 3500 cfm at 110 psi. It has 700 hp.

A 10-in. main runs from each 600-hp unit to a single aftercooler which serves both compressors. Air passing through one of two receivers is carried to the mill through a common system. From the 700-hp unit, the air leaves through an 8-in. line, travels through an aftercooler, a receiver and on to the mill.

Compressors are located in the mill to eliminate an extensive distribution system and to keep maintenance costs down.



This chart from a Bristol's Recorder shows the changes in air demand during a 24-hour period

Maintenance—Here are some of the installation and maintenance rules J&L engineers say are important to watch:

The primary requirement, they feel, is competent personnel. A little observation, knowledge and interest in the work go a long way. Competent help is the key to a good preventive maintenance program, too. These are a few features regularly scheduled:

Journal bearings are looked over for wear. Thrust bearings are checked for axial position, condition of adjustment shims and wear.

Couplings are cleaned and examined. If there is any question about them, they are replaced. Both halves of gear-type couplings are replaced.

Compressor casings and rotors are examined for corrosion, erosion and fouling. Other stationary parts are examined at the same time; rotor condition and clearances are also checked.

Lubrication—Most compressors need three kinds of oil: One for the cylinder, another for the crankcase and bearings and a third for the power cylinders.

Single - acting, trunk piston compressors require a single, good lubricant for the cylinder and crankcase. It's known as compressor-cylinder oil.

For the double-acting types, use only compressor cylinder oil for the cylinder; any good crankcase oil is satisfactory for the running gear.

For compressors driven by steam engines, cylinder oil should be the steam cylinder type. It is also important to tell the vendor the operating conditions.

Steam—J&L engineers say they regard these seven factors the most important in lubricating a steam engine compressor: 1. Initial steam pressure. 2. Quality of steam or percentage of moisture in the steam. 3. Degree of superheating. 4. Exhaust pressure and temperatures of high and low pressure cylinders. 5. Type of exhaust (condensing or noncondensing). 6. How exhaust steam is used. 7. Type of lubrication system.

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TESTS ON STAINLESS STEEL VANED ROLLS by a New Hampshire pulp and paper-processing equipment manufacturer demonstrate how the "Equivalent Grade" Charts hide tremendous differences in carbides' production abilities. With Grade "X," production per tool was limited to two pieces per grind. Machine speed had to be held down to protect the carbide.

Switching to Grade 370 brought the manufacturer 8 to 9 pieces per grind. Machine speeds were doubled; 14 hours a day in labor were saved. Result: savings of more than $100 a week, in addition to lower downtime, grinding, and inventory costs.

SO-CALLED "Equivalent Grade" Charts hide the fact that no two carbide grades will produce the same results. Because they classify carbides by broad areas of application, the Charts ignore important differences in production ability.

Thus, they mislead buyers into believing they can safely purchase the cheapest grade listed for a job.

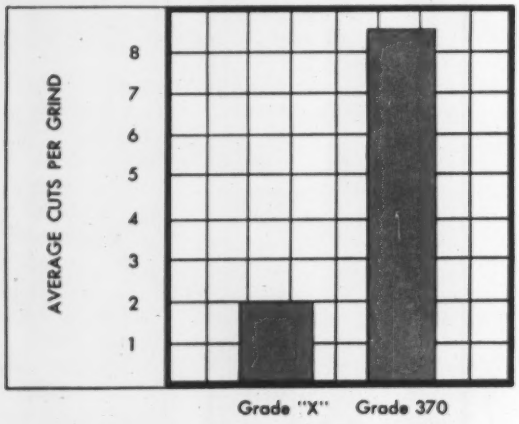
But actual tool-comparison tests have proved conclusively that the production abilities of carbides *do* vary tremendously. Moreover . . . these tests show that the pennies saved by buying on low initial cost often lead to thousands of wasted dollars . . . in lost production, lower machine efficiency, non-productive man-hours.

The case history at left is one of hundreds demonstrating why cost per finished piece — not initial cost — is the only reliable guide to buying carbides.

Results of an actual comparison test

According to the "Equivalent Grade" Charts, any one of several carbide grades could handle the job of machining these rolls. The manufacturer tried Grade "X" first — because it cost 10% less, initially, than Carboloy* Extra-Performance Grade 370.

Grade "X," however, machined only two rolls per day. Grade 370 increased production to 8 or 9 pieces per day (Graph No. 1).

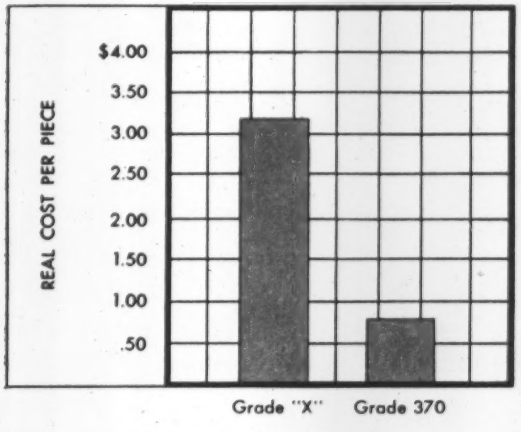


Graph No. 1—Production Ability Comparisons

A FEW CENTS MORE PERFORMANCE CARBIDES

When the *real* cost of the tools was calculated, the manufacturer found the initial saving with Grade "X" was actually *making* him *lose* more than $100 a week. Here's why:

The real cost of Grade "X" was $3.18 per piece machined (2 pieces from a $6.37 tool). The real cost of Grade 370 is just $.82 (average of 8½ pieces from a $7.01 tool). On the weekly production of 42-43 rolls, the saving totals $100.30!



Graph No. 2—Real Cost Comparisons

Yet even this eye-opening figure does not tell the whole story. The Grade 370 tool operated at twice the speed of Grade "X." It helped save the manufacturer 14 hours a day in labor. It provided twice the tool life. It eliminated a special finishing tool.

When these facts were translated into dollars and cents, the manufacturer found that downtime costs were reduced, because the tool remained on the job longer. Grinding costs were reduced, because the tool required less maintenance. Inventory costs were reduced, because a few tools did the work of many.

When added up, these amounted to a considerable saving—yet nothing in the "Equivalent Grade" Charts could have forecast it. These are savings which buying on the basis of initial cost always obscures. These are savings which more than justify spending a few cents more for carbides with extra production ability.

Carboloy Extra-Performance Carbides available for all steel-cutting jobs

Heavy-Duty Grade 370, used in the test above, is one of three Carboloy Extra-Performance Carbides. Together with Medium-Duty Grade 350 and Finishing Grade 330, these grades cover the entire steel-cutting range from roughing to finishing.

Extra-Performance Grades 330, 350, and 370 cost more, initially, because they are made by a unique and more costly process. But their performance so far exceeds conventional carbides that there are actually no "equivalent" grades for any of them. They cannot be fitted into the arbitrarily selected cubbyholes on the "Equivalent Grade" Charts now in common use.

These Extra-Performance Grades easily expose the fallacy of the "Equivalent Grade" Charts, because they are so superior to other steel-cutting grades. But even when attempting to classify conventional grades, the Charts exhibit the same fatal flaw.

Because there is no way of knowing in advance how any grade will perform on the job, we make this suggestion: Always run your own comparison tests *before* you specify a grade. When the results are in, you will find that one grade will bring your plant significant savings in tool costs, machining and labor expense.

We think you will find *that grade* will be one of the Carboloy Extra-Performance Carbides. But whatever it is, specify it *by name*. Do not settle for an "equivalent" grade.

If you would like a more detailed discussion of the whole problem of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a sales engineer to call on you. Send your request to: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Street, Detroit 32, Michigan.*

CARBOLOY

CEMENTED CARBIDES

*CARBOLOY IS A TRADEMARK OF GENERAL ELECTRIC COMPANY

J&L's open hearth shop. Compressed air is used to operate ore bin doors. Twenty furnaces use about 230 million cu ft of air every month

J&L's strip mill. Reciprocating compressors supply 240 million cu ft of air a month. Three furnaces shown heat 100 tons an hour

those factors, he can help you reduce maintenance costs and possible breakdowns.

Cylinders—Compressor cylinder lubrication depends on seven factors: 1. The kind of gas compressed. 2. The ratio of initial and final pressures inside the cylinder under normal operation. 3. Maximum cylinder temperature. 4. Number of compression stages. 5. Type of cylinder cooling. 6. Type of lubrication system. 7. Approximate size and speed of the compressor.

You must use great care in lubricating compressor cylinders, say J&L engineers. Oil viscosity should be on the high side if cylinder temperatures are high. One example: A single-stage machine with a 7:1 compression ratio.

Water Supply — For effective performance, you must have a liberal supply of clear, cool water. If it's too cold, condensation may form in the air inlet passage of the high pressure cylinder. It goes from there to the air cylinder, destroys the lubricant and causes rapid cylinder and valve wear. To relieve this, pass exceptionally cold water through the intercooler first. Another way is to reduce the water supply to the cylinder jackets so that the discharge temperature is between 100 and 115°F.

When shutting down the compressor in freezing weather, don't forget to open all jacket and cooler drains.

Open funnels for outlet water encourage more frequent temperature readings. If you have to use closed funnels, install sight flow indicators on the water discharge from cylinders and intercooler. They show positively whether water is circulating.

The discharge pipe should be by-passed to an open funnel so that the cylinders and coolers can be tested frequently for leaks in the water jacket or intercooler tubes. When the water discharge is opened to the overflow funnel, and the valve on the discharge line shut off, any leaks between the air and the water spaces will show up as air blowing out with the water.

Softener—J&L considers its use of Zeolite for water softening a unique maintenance feature. River water, filtered through a bed of resinous Zeolite, is circulated through the cooling system of compressors. It's an additional insurance against foreign particles and an added protection against rust and corrosion.

Used water is stored for further use.

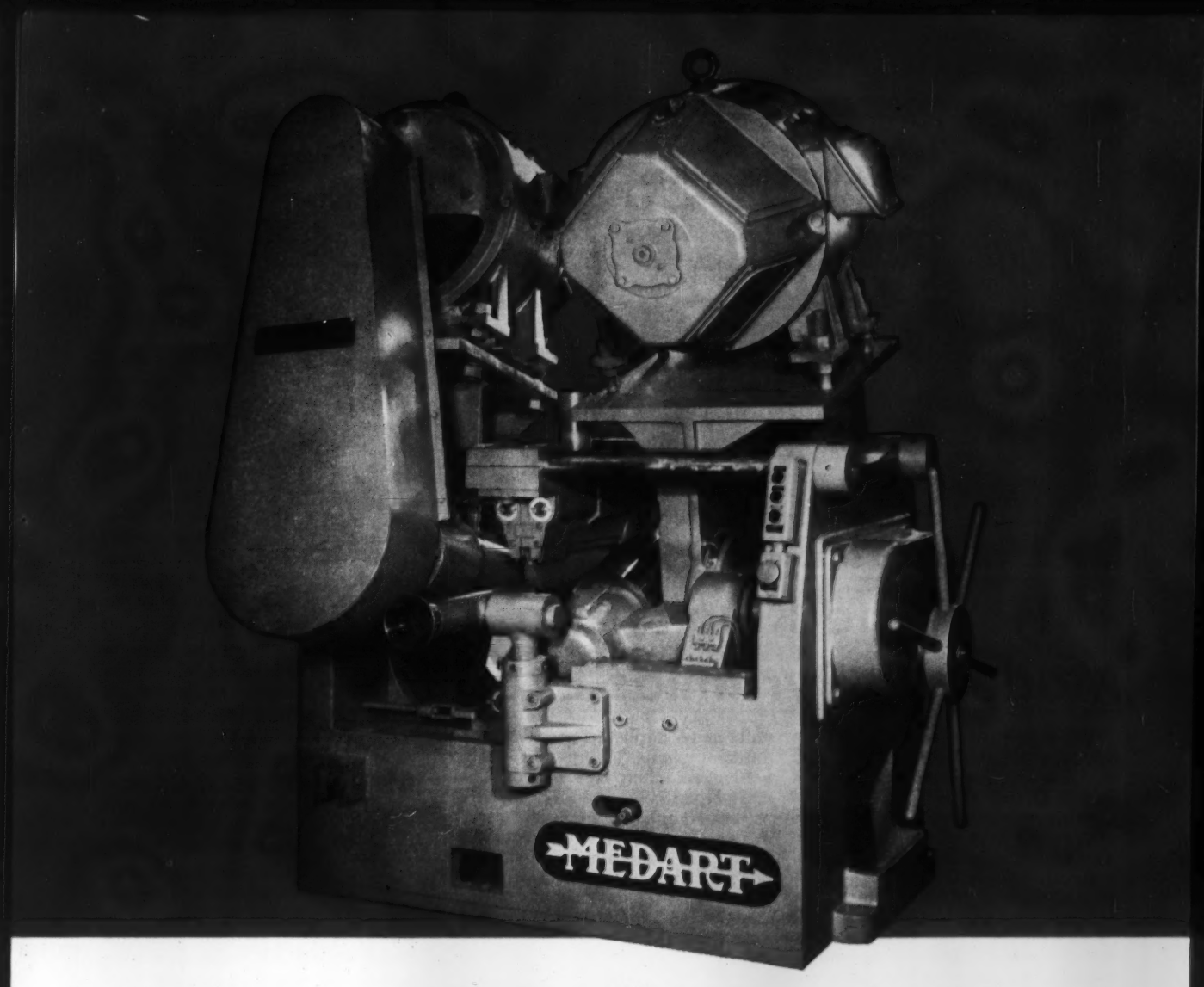
About Dust — Use an air filter where excessive dust and dirt are in the air. Dirt sucked into the compressor causes wear. Don't put an air intake near a steam exhaust or an outlet fan from a room.

Intake piping should be the full diameter of the intake opening and as short and direct as possible. Standard steel or sheet metal pipe makes the best intake above the floor; vitrified is better underground. Cement pipe joints to make them watertight. Water seeping into the intake gets into the cylinder, washes the lubricant away.

If you use a concrete duct as an air intake, it should have a smooth, hard interior surface. Compressors used in the vicinity of corrosive fumes must be specially protected.

Air Discharge — Run the discharge pipe directly to an aftercooler. It should be smaller than the full size of the compressor outlet. The discharge should run directly to the air receiver if no aftercooler is used. The air receiver should be outside if possible, and as close to the compressor as practicable.

A hot discharge line should not



BLAW-KNOX MEDART makes what it takes

for high speed straightening of cold finished stock

Designed around the principle used in the famous Blaw-Knox Medart 2 roll Rotary Straightener, the 2 & 2 Universal Straightener is especially adapted for high speed applications. It is widely used in a direct production line with a draw bench for high speed straightening of cold drawn bars.

In this machine, each roll is driven by its own motor through a completely enclosed V-Belt drive. This simplified arrangement keeps downtime and drive maintenance to a minimum. What's more it provides for control of throughput rates by varying the speed of the motors. Roll speeds are synchronized by means of electrical interlocks between the motors.

Space requirements are kept to a minimum through compact design and the small number of working parts. This compact set-up simplifies discharge of work from the machine, making it ideally suited to shorter length workpieces.

The Blaw-Knox Medart 2 & 2 Universal Rotary Straightener and Polisher is available in sizes to handle bars and tubes in diameters of ⅛″ to 4½″. Contact us for detailed information, technical assistance or service.

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This exact measurement stick, made of enduring Black Granite is the Master Gage. With this Royal Cubit length, you test the truth of all working Cubit Sticks every Moon Cycle.

How the King's Arm Made the Pyramids Exact

The Egyptians started it more than 5,000 years ago when they established the first standard of measurement known as the "Cubit Stick". It was the exact length of the Egyptian ruler's arm from elbow to fingertip. This official length was preserved on a Royal "Master Cubit Stick" made from a shaft of black granite (even today the most stable and endurable of all granites). The accuracy maintained by the builders of the superb obelisks, pyramids and temples was accomplished by regularly checking their working "Cubit Sticks" against the "Master Cubit Stick".

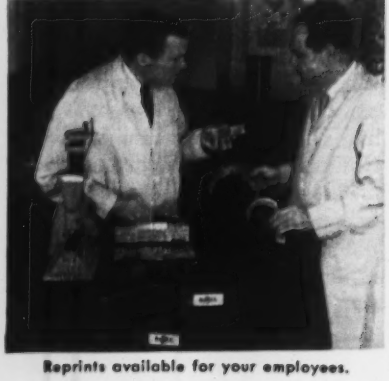
This is the original concept of today's gage block as a master reference gage for inspection and for checking all other measuring instruments.

The backbone for industrial use of the standard unit of measurement today is steel gage blocks used in conjunction with black granite surface plates accurate to millionths of an inch. All other measuring instruments such as micrometers are calibrated and regularly checked against these gages in order to maintain their accuracy.

With our refined measurement tools American industry can make millions of duplicate parts in many different plants, all interchangeable with each other. Net result is our mass production economy that gives us an abundance of high quality moderately priced goods and gadgets.

The Egyptians combined slave labor with meager tools and produced great plenty for the rich and mighty. We combine free labor with abundant tools and produce great plenty for all.

Produced by DoALL are black granite gaging instruments, gage blocks, and a wide range of accessories, including micrometers, comparators, monolights for product inspection as shown below. Textbooks and free instruction in the "Science of Precision Measurement" are available from DoALL.



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Des Plaines, Illinois E-54

PROGRESS . . .

contact wood or other flammable material. If the line is more than 100 ft long, use pipe of the next larger diameter.

Avoid unnecessary pockets. If one is formed between the compressor and the aftercooler or receiver, equip it with a drain valve or trap to avoid accumulation of oil and moisture.

In certain installations, pipeline surges or pulsations may occur in the intake or discharge lines, causing vibration of the pipe. This may necessitate additional horsepower to drive the compressor.

A common cause of pressure surge is a discharge line which is too long—the receiver is a considerable distance from the compressor. It can be avoided by installing a surge drum as near to the compressor as possible.

Keep hot air pipelines clean to avoid the danger of fire in accumulated dirt and oil. Piping should drain toward the aftercooler and receiver. Flanged fittings or unions close to the compressor permit removal of the cylinder at any time. Overhead piping should be well supported to relieve the compressor of unnecessary stress.

Condensate—An air line free of moisture is essential to effective operation. It can be done by inserting traps at frequent intervals. They should be located at low points and ahead of outlets. Automatic ones can be purchased, or you can make them from pipe fittings. Use tees with a hanging pipe leg and a bottom drain.

Traps are effective only where the air has been cooled, and the moisture precipitated. Use an aftercooler where there is little opportunity for air to cool in the line. If you don't like them, try small air receivers installed at frequent intervals. Provide suitable piping to permit regular draining.

Shutoffs—A globe or gate valve may be placed in the discharge line between the compressor and aftercooler, or between the compressor and receiver when more than one compressor discharges into a single aftercooler or receiver. If you can use one, be sure to install a safety valve between the cylinder and the shutoff valve. The compressor may be

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	**High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.**	**Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.**
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	**Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.**	**Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.**
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	**Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.**	**Patching linings and baffles and for any application where plastering rather than gunning or casting is required.**
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	**Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.**	**Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.**
B&W Kaolite 22	2200	**Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.**	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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PROGRESS . . .

started at some time with the stop valve closed. If there is no safety valve, you may burst the cylinder.

Remember that the safety valve (or valves) should be large enough to handle the entire output of the compressor.

Drain steam piping toward the compressor to avoid low spots or pockets. A drain in the steam pipe on the boiler side of the compressor should be as close to the boiler as possible. Live steam pipes should be properly insulated. The use of a steam separator and trap is recommended. They increase safety and economy since they supply drier steam.

For convenience in repair work, repacking, or regrinding the throttle valve, it is helpful to place a stop valve at the point where the steam pipe branches from the main lines. It will stop the compressor if the regular valve becomes inoperative.

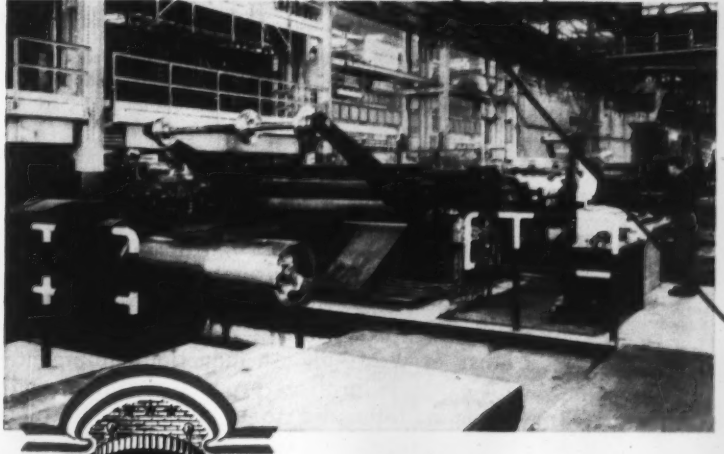
Lay exhaust piping beneath the floor at the side of the engine room. The pipe leading to the riser should have a drain to remove condensation at the lowest point.

Purge — The receiver of compound steam cylinders must be drained. When doing this, open the drain before starting, and turn live steam into the receiver through a by-pass valve. The receiver, as well as the steam cylinders, should be thoroughly warmed before starting. Always use an automatic condensate trap.

If you also use a condenser, connect the main exhaust pipe to it, but provide an opening to the atmosphere with an automatic relief valve. A stop valve should be placed in the exhaust pipe between the condenser and relief valve. Exhaust piping should drain toward the condenser; if there is any low spot, as in a barometric condenser installation, a drain must be connected to a trap or to a collecting tank. Drain it while the unit is operating.

With industry expanding and producing at an unprecedented rate, don't overlook the importance of air. It can be a major factor in controlling your rising production costs, say J&L engineers.

One of the largest slitting & coiling lines



Photos show Stamco slitting and coiling unit in cold strip mill

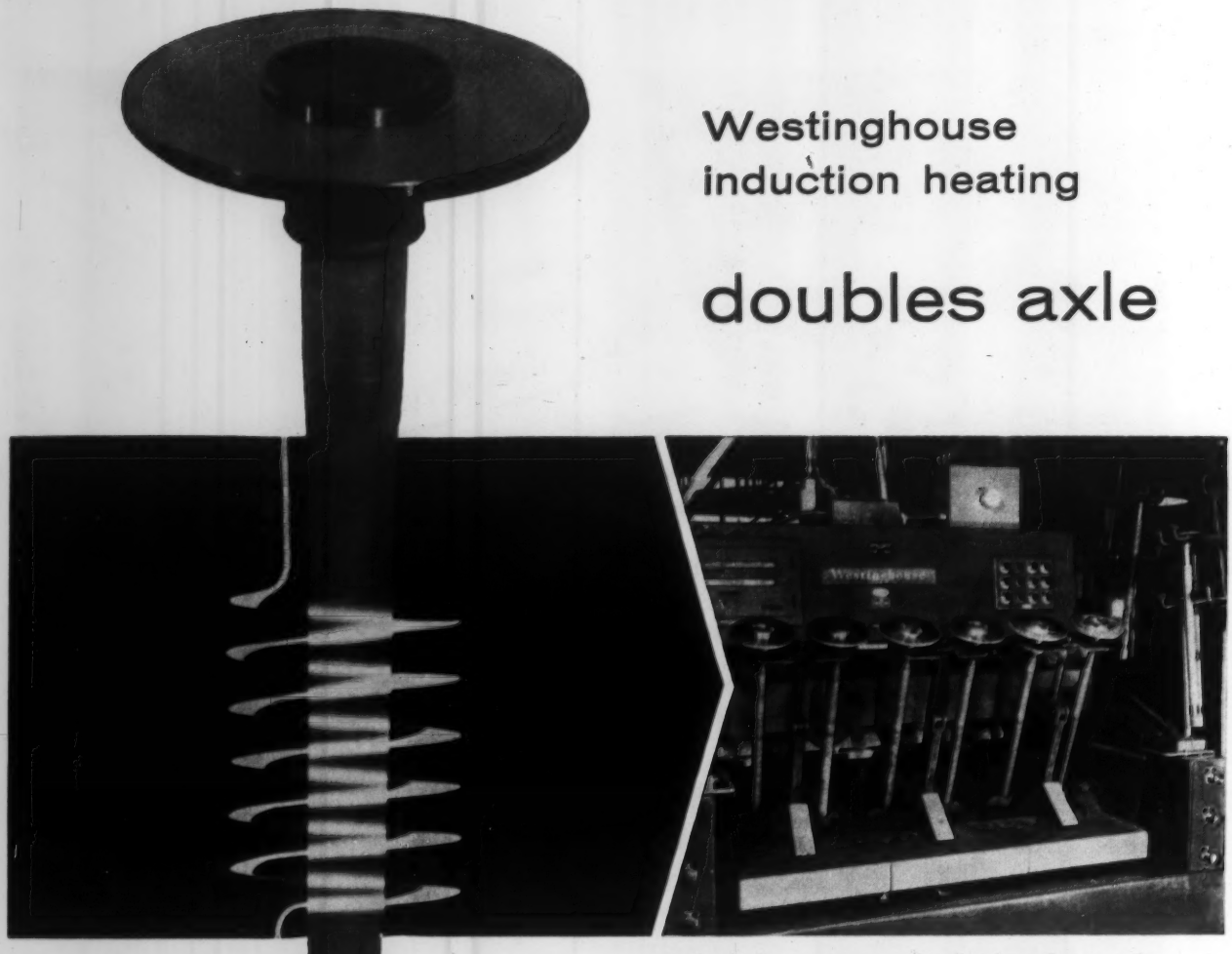
60,000 pound, 75 inch wide—Slitting and Coiling Line

Years of experience have given us the ability to furnish equipment to meet every slitting and coiling requirement. Bulletin SC55 gives our complete story. Ask for it on your letterhead. No obligation.

• LAY YOUR SLITTING PROBLEMS AT STAMCO'S DOOR •

STAMCO, Inc., New Bremen, Ohio

Westinghouse induction heating doubles axle



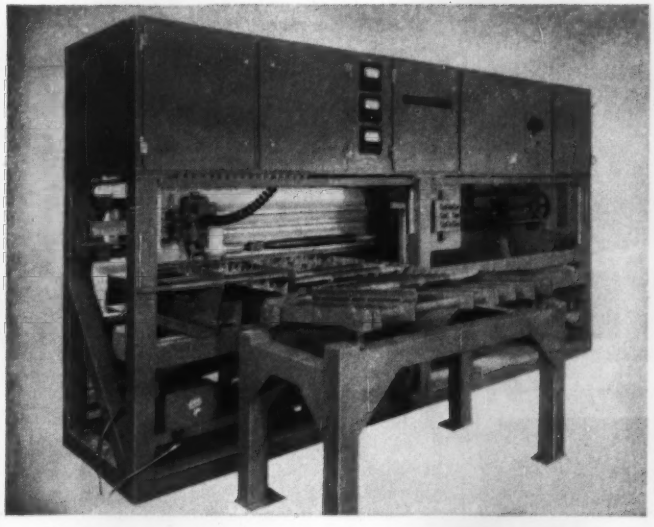
1. A single operator surface-hardens 6 rear-axle shafts at each setup of this Westinghouse induction unit. Production per hour totals 210 shafts.

R. E. Cheek
Manager, Induction Heating Department

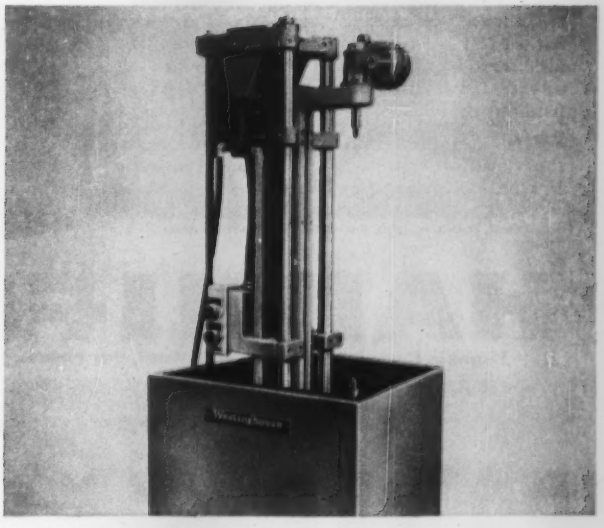
"Three different axle-hardening applications," reports R. E. Cheek, "show a slice of Westinghouse experience in solving production line heat-treating problems. Dependability of Westinghouse induction equipment, for example, protects production timing and holds maintenance to a minimum. Results are measured, too, in three important profit advantages."

1. Twice the axle fatigue life is obtained from lower cost, plain carbon steels. No more need for costlier alloys.
2. Lower carbon steels lengthen tool life . . . reduce machining and replacement costs.
3. Axle shaft distortion is minimized by rapid induction heating and quenching.

fatigue strength . . . lowers cost



2. As many as 33 axle shafts up to 42 inches long and weighing up to 100 lbs. are surface-hardened by this Westinghouse induction equipment.



3. Westinghouse general-purpose induction scanner handles shafts up to 30 inches long, 80 lbs. weight, for surface-hardening and quenching.

Many other factors, such as savings in floor space, rapid start-up, and cooler more productive working conditions add to the high efficiency of each installation.

A profit return for you? Westinghouse induction-heating experience can show you production problems turned into profitable solutions for hardening, annealing, joining, or forging. Why not call on your local Westinghouse industrial heating sales engineer? He'll bring you expert problem solving and complete service. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Penna. J-10455-X

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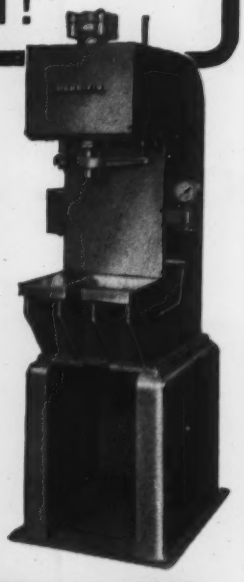
*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

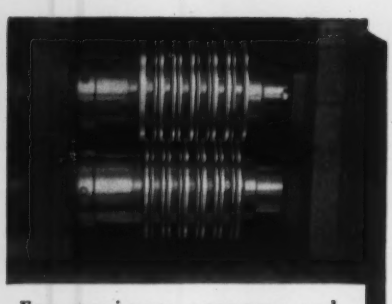


HANNIFIN

Hannifin Corporation, 523 S. Wolf Road, Des Plaines, Illinois

COWLES

SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

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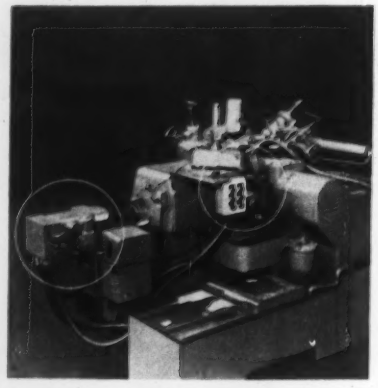
Grinder Gaging

Automatic controller is said to increase centerless production 50 per cent, reduce rejects

IF you use one man to operate two or more centerless grinders, you can solve the problem of accuracy with an automatic gaging control.

Kaydon Engineering Corp., Muskegon, Mich., has one called the Size-O-Tron which it says will adjust a wheel head slide in increments as small as 0.000025 in. Manual gaging is eliminated; fewer machines are required on multiple passes; and they can be run 50 per cent faster than hand operated ones.



ELECTRONICS

. . . control centerless grinder

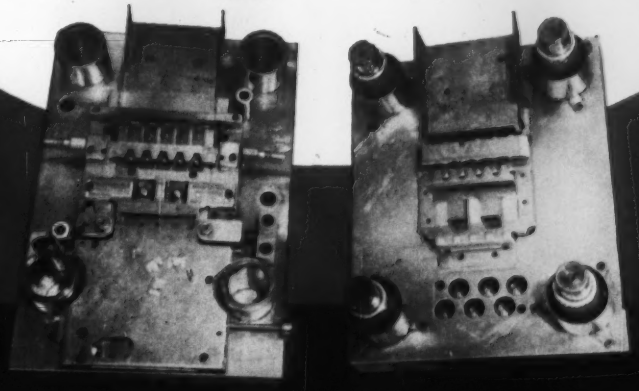
Operation—The unit consists of a gage control and a machine adjuster. An electronic pickup unit is located at the work outlet. Its signal passes through a classifier and calibrated meter.

The machine adjuster controls the grinder through a rapid traverse gearmotor, a feed motor and a pulsating actuator, which are controlled by the gage unit.

Detection — When parts being ground deviate more than 0.000010 in., the controls begin to make adjustments. If something occurs that the gage cannot compensate for, the equipment stops and a red light warns the operator.

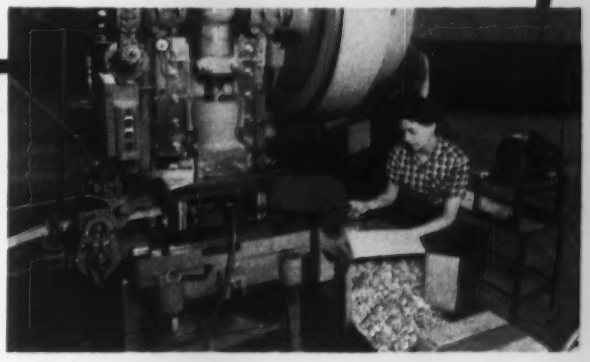
A recorder is used with the equipment. It prints a continuous record of the size maintained, indicates shutdowns and is a permanent record of the day's production.

This Olympic FM DIE



produced 68,000,000 parts . . . and ready for more!

Fisher Industries, Inc., Birmingham, Mich. used DESEGATIZED® Olympic FM die steel because . . .



1. Excellent wear resistance of Olympic FM extended the normal life of the die.

2. An estimated 25-30% savings in machining costs has been experienced with Olympic FM dies of this type.

At Fisher Industries, Inc., Birmingham, Mich., the Olympic FM die (shown above) blanks and forms universal clips from .031"-.037" zinc plated #4 Temper 1010 cold rolled steel. When photographs were taken, a total of 68,000,000 pieces had been produced on a press operating at 330 strokes per minute fabricating 5 clips per stroke.

Die makers and users throughout the metal-working industry have found that Latrobe's Olympic FM die steel consistently results in lower die production costs, superior machined finishes, and longer production runs than comparable type die steels. One of Latrobe's DESEGATIZED® steels, Olympic FM is a free-machining high carbon-high chromium die steel . . . the improved machinability characteristics resulting from the addition of alloy sulphides uniformly dispersed by the DESEGATIZED® process of manufacture.

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No Short Circuits

COLD DRAWN stainless steel protects users of electric ranges from short-circuited heating elements in a unique way. The stainless equipment for filling the heating rods with insulation prevents iron oxide contamination.

Heater rods are made from metal tubing with a helix wire heating element centered inside. Magnesium oxide is packed around the wire to insulate it electrically from the housing, and yet permit good heat transfer. If iron oxide contaminates the insulation, it will short-circuit the heater rod.

Equipment—S. A. Oakely Co., Skokie, Ill., builds the filling equipment. It consists of 24 sets of type 304 stainless tubes, cut from tubing supplied by Superior Tube Co., Norristown, Pa. Each set of filler tubes is made up of one tube telescoped into another.

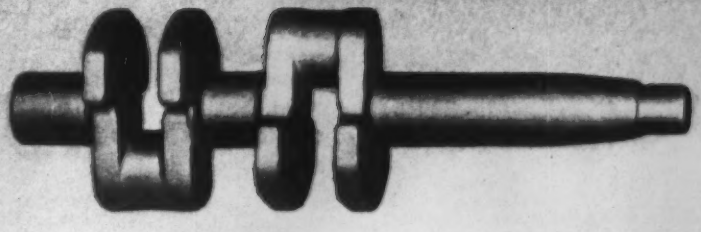
The outer tube is about the same diameter as the heater rod. The inner tube is slightly larger in diameter than the helix wire. The diameter difference between the tubes is about the same as the thickness of the magnesium oxide between the wire and its housing.

Procedure—In filling, a stainless rod is lowered through the inner tube and centered. The wire is attached to a hook on the end of the rod. Magnesium oxide is put in the space between the tubes.

As the heater tube begins to fill up, the stainless rod is drawn up through the inner tube, bringing up the wire and centering it.

How often do you find a flaw in a coin?

...or in a FORGING?



(Both are made by the same basic process)

When closed impression dies strike a coin, or hammer out a forging, they produce a result that gives specific advantages — **freedom from concealed flaws, closeness to tolerance, strength without bulk, superior resistance to impact and fatigue stresses.** These advantages mean fewer part rejects, greater overall economy, better product dependability and performance. These advantages are all found in forgings, **the metal you can trust.**

Do you have a part design problem? Are you now purchasing parts, made by other processes, which require extra metal to provide strength? Are you using weldments, or fabricated assemblies? You will find that often forgings can eliminate extras, and yet give you quality-plus advantages.

Make it a point to call in a forging engineer to learn more about how up-to-date methods and techniques of forging can help to reduce your products or part cost.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

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Symbolic emblem of the Drop Forging Association

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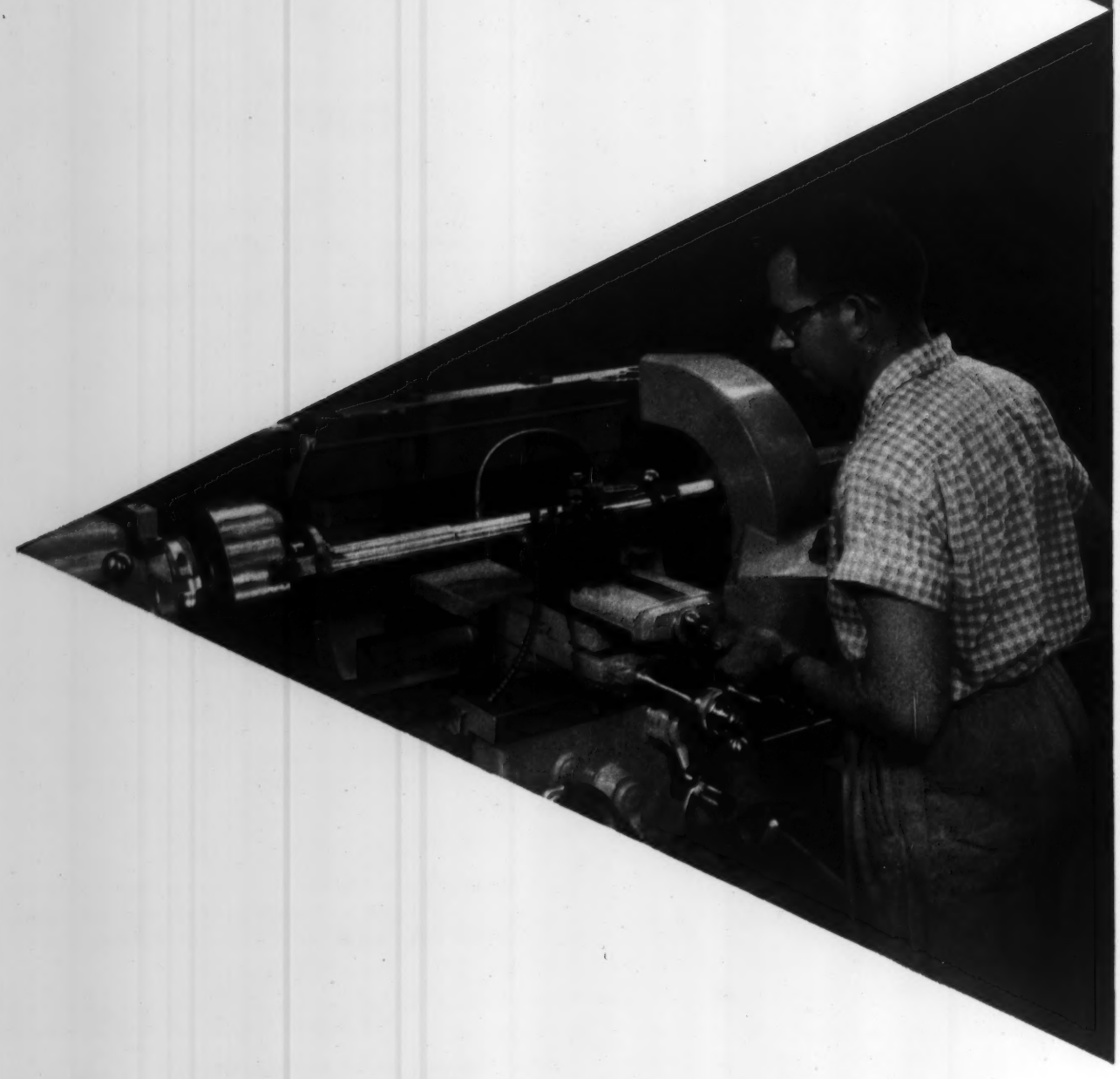

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The Rockford Tracer Lathe can be converted to a completely standard engine lathe in a matter of minutes, thus adding to its versatility and flexibility for small lot production.

Complete interchangeability of multiple diameter work can be achieved by unskilled operators at production speeds comparable to turret lathes. These machines are rugged enough for heavy production work, yet flexible enough for tool room or job shop production.

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Kopy-Kat Valve features proven accuracy, precision manufacture, built-in retract.

Power unit requires no additional floor space - includes sealed unit, compensating pump and filter.

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All hydraulic lines are clear of chips and coolant - out of the operator's way.

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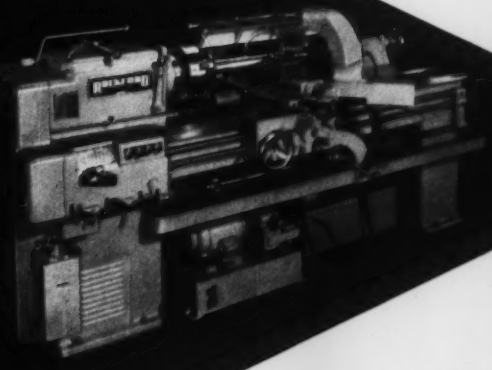

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Table 1.—Guide to Proper Heater Wattage

To find total kilowatts of heaters to be installed in the tank, divide kilowatt hours from the table by the number of hours heat-up is desired. The table applies to tanks with 2 to 4 in. of insulction on sides and bottom.

Liquid To Be Heated		Degrees F Temperature Rise						
		20	40	60	80	100	120	140
Cubic Feet	Gallons	Kilowatt Hours To Heat Solution in 1 Hour						
0.5	3.74	0.2	0.4	0.6	1	1.2	2	2
1	7.48	0.4	0.8	1.2	2	3	3	4
2	14.96	0.8	2	3	4	5	6	8
3	22.25	1.2	2	4	6	8	9	12
4	29.9	2	3	5	8	10	12	16
5	37.4	2	4	6	9	12	15	20
10	74.8	4	8	12	18	24	29	38
15	112.5	6	12	18	27	35	43	56
20	149.6	8	16	25	35	46	57	73
25	187	10	20	32	44	57	71	91
30	222.5	12	24	38	52	68	86	108
35	262	14	28	44	61	80	100	126
40	299	16	32	51	70	91	114	143
45	336.5	18	37	57	79	102	128	160
50	374	20	41	63	87	113	141	179
55	412	22	45	70	96	124	155	196
60	449	24	50	76	105	135	170	214
65	486	26	54	82	113	146	183	232
70	524	28	58	89	122	157	197	250
75	562	30	62	95	131	168	211	268

As the number of industrial steam plants dwindles, electricity assumes more heating jobs. In plating tank heating, it's becoming competitive costwise

Electric Heat for Plating Baths

By J. A. BAKER
General Electric Co.
Schenectady, N. Y.

STEAM used to hold a big edge on cost for heating plating baths, but the picture has changed. Electric heat is not only ready to compete with steam; it offers the following qualities to offset steam's dwindling cost advantage:

1. Low initial installation cost.
2. Easy replacement without shutdown.
3. No dilution of bath.
4. No hot steam pipes.
5. Cooler working conditions than with steam.
6. Close temperature control.
7. Economical operation.
8. Automatic operation.

Yes, But — In the opinion of many plating plant operators, these add up to a dollars and cents advantage for electric heat, but they have shifted over from steam with reservations. The reason: Stray currents that either plate out the bath on the heaters, or erode the heaters into the bath.

This complication, while real enough, can be controlled. The answer lies in proper heater selection, installation, power and maintenance.

Selection — The most efficient electric heaters are direct immersion types. A typical one consists of a coiled resistance wire, magnesium oxide insulation, an outer protective sheath and terminals for connecting to the voltage source. Both over-the-side and through-the-side (of the tank) models are used, with the first being the most popular principally because of easy installation and maintenance.

First consideration is the sheath: It must withstand the corrosive attack of the bath. Because it will be considerably hotter than the bath, it will probably have to be made of a material more corrosion resistant than the tank walls (which get no hotter than the bath). Use Table 2 as a guide to selecting the right kind of heater sheath.

Over or Through—Over-the-side heaters will work best in 95 per cent of all installations. They may be inspected, cleaned and replaced without emptying the solution—important when there is a possibility of electrolysis and excessive corrosion.

Through-the-side heaters are advisable only when there is too little clearance to bring them over the side. They must have screw-in plugs that, like the sheath, will withstand the corrosive effects of the liquid.

Wattage — Heat density on the sheath is also important. If it is too high, it will not be properly dissipated by the solution and heater failure may result. It is necessary to select the proper wattage to be used in a given tank (see

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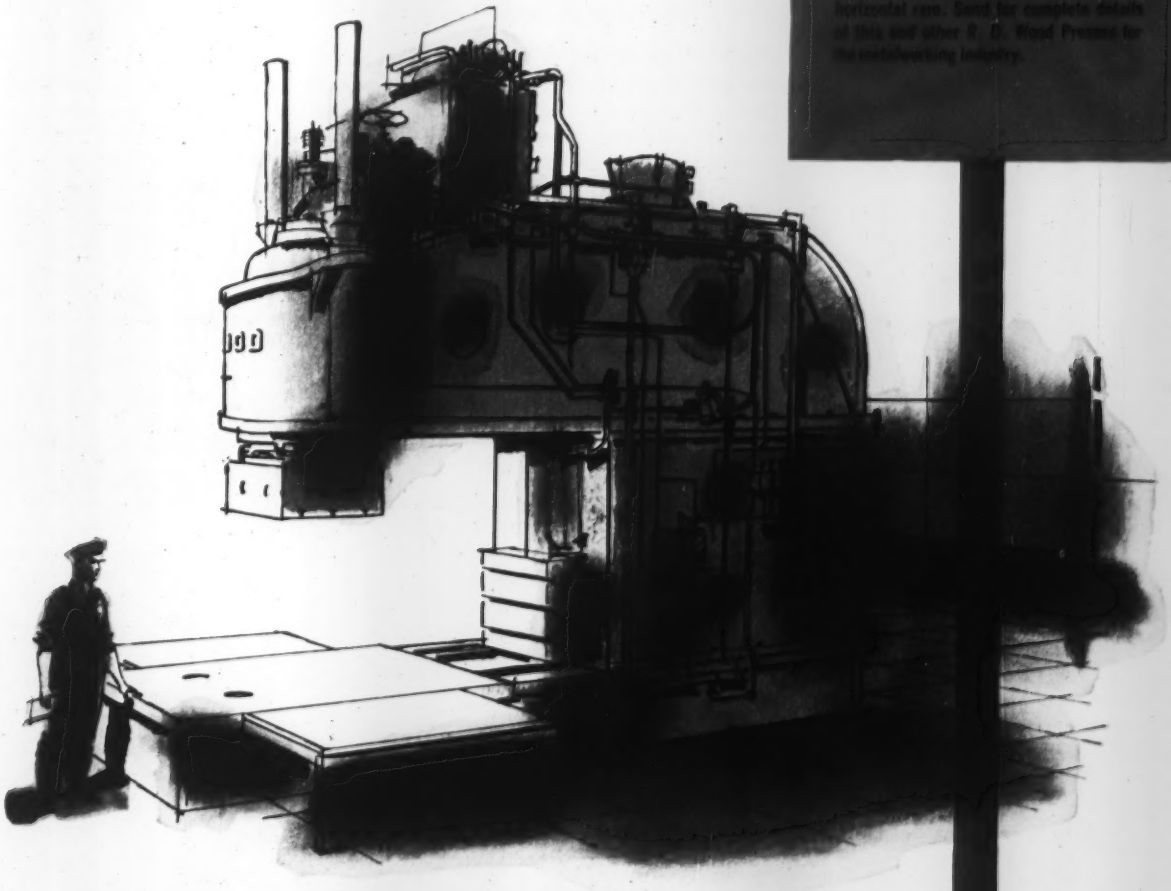

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Table 1), and to control the heat density with a thermostat.

Whatever the type of thermostat, care must be taken to see that it does not corrode in the liquid. Three preventive measures: 1. Use a noncorroding bulb sheath. 2. Cover the bulb with a plastic coating. 3. Put the bulb in a dead end well and use a heat transfer medium such as lead or oil from bulb to well wall. The closer the thermostat is to a heater, the quicker its response to temperature change.

Installations—The main thing to remember in installing heaters is to maintain free circulation. Heaters should not touch the sides of the tank, and should be at least 2 in. off the bottom.

Keep the heaters at least 6 in. away from electrodes to prevent stray currents from pitting the heater sheath. If they still pit, check for other electrical grounds and eliminate them. If nothing else works, place a metallic "thief" or glass plate barrier between the heater and the nearest metal in the bath.

Insulation — Heat loss through the sides and top of the tank accounts for most of the cost of heating. Insulation will pay for itself in a hurry. Figure 1 in. of

Table 2—The Right Heater Sheath

Sheath Material	Plating Solution
Lead (1)	Copper acid sulphate, nickel, cobalt, electroplating stainless steel. Sulphuric acid concentration 10 per cent or less; no other acids.
Quartz (1)	Copper acid sulphate, nickel or cobalt (all concentrations); ferric chloride; chromium; zinc or cadmium acid sulphate; electroplating stainless steel.
Plain or stainless steel (2)	Copper alkaline cyanide; zinc or cadmium alkaline cyanide; tin, gold, silver and most other alkaline solutions; brass.
Nickel (1)	Lead carbonate.
Proper watts density	(1) 10 to 25 (2) 10 to 56

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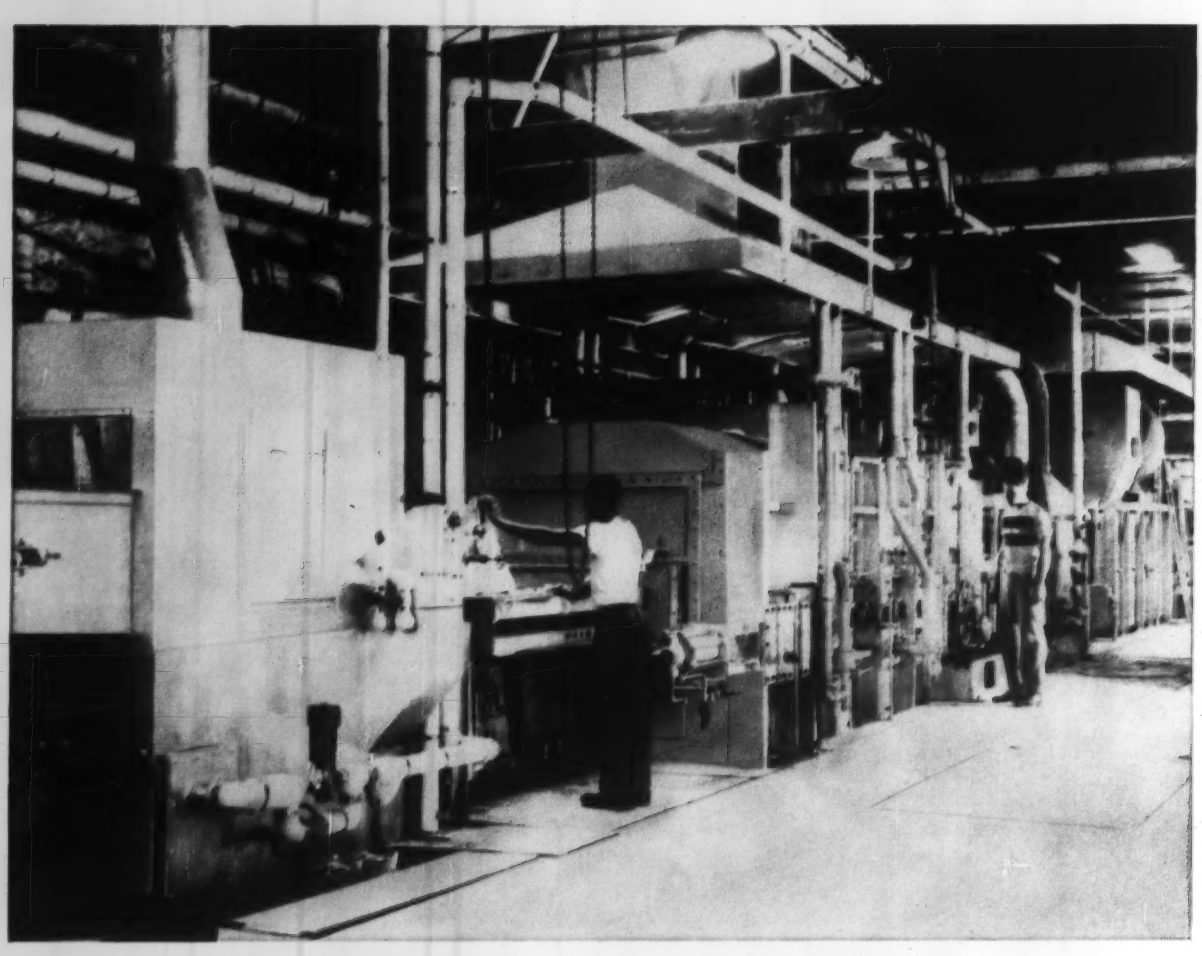

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This is one of many demonstrations that Surface automatic heat treating can help you get the most for your production dollar.

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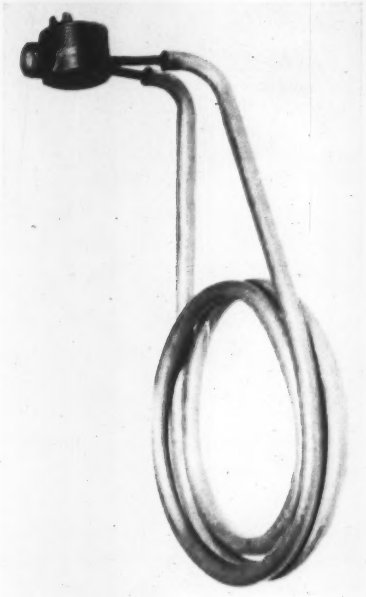

Fig. 1—Over-the-side immersion heater for nickel and copper plating

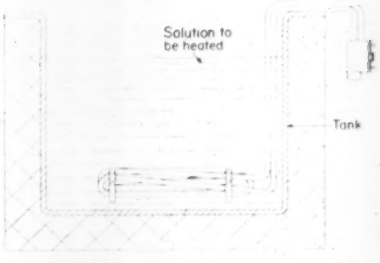

Fig. 2—Proper installation of over-the-side immersion heater

insulation for each 100°F above room temperature and a minimum of 2 in. in any case.

Insulated covers are worth the investment, even when they can be used only during heat-up and stand-by periods.

Power — A big heater installation can draw an appreciable amount of current. Better check with your local power company to be sure that the electrical capacity of your plant is sufficient to carry the additional load. Oversize wiring will give you a safety factor and allow something for expansion.

It's a good idea to standardize on one voltage for your heaters: It makes procurement and replacement easier. Standard heaters are available in 230 and 460-volt ratings.

Many shops want a three heat installation: High heat (full wat-

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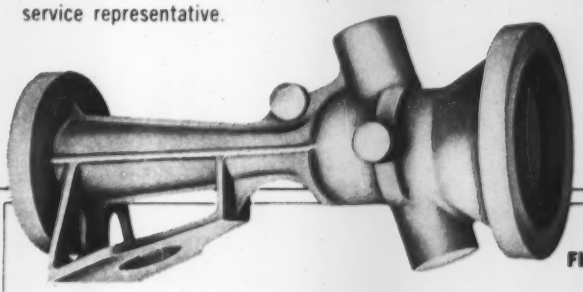

DESIGN FLEXIBILITY

Parts similar to this stainless steel valve body for an air flow controller often require several changes before design is finalized. Due to the relatively low cost of dies and die changes, the investment casting process has proven an inexpensive and flexible method.

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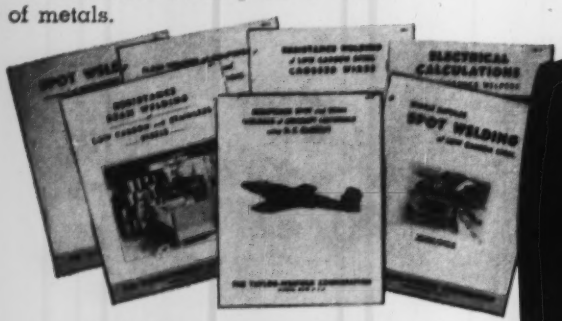

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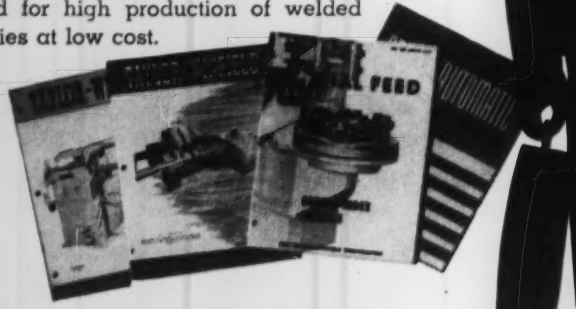

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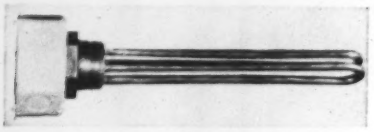


Fig. 3 — Through-the-side immersion heater with threaded header

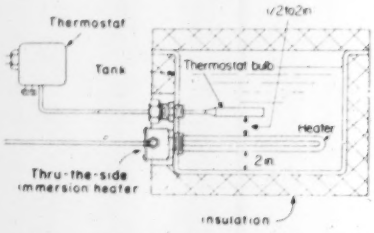


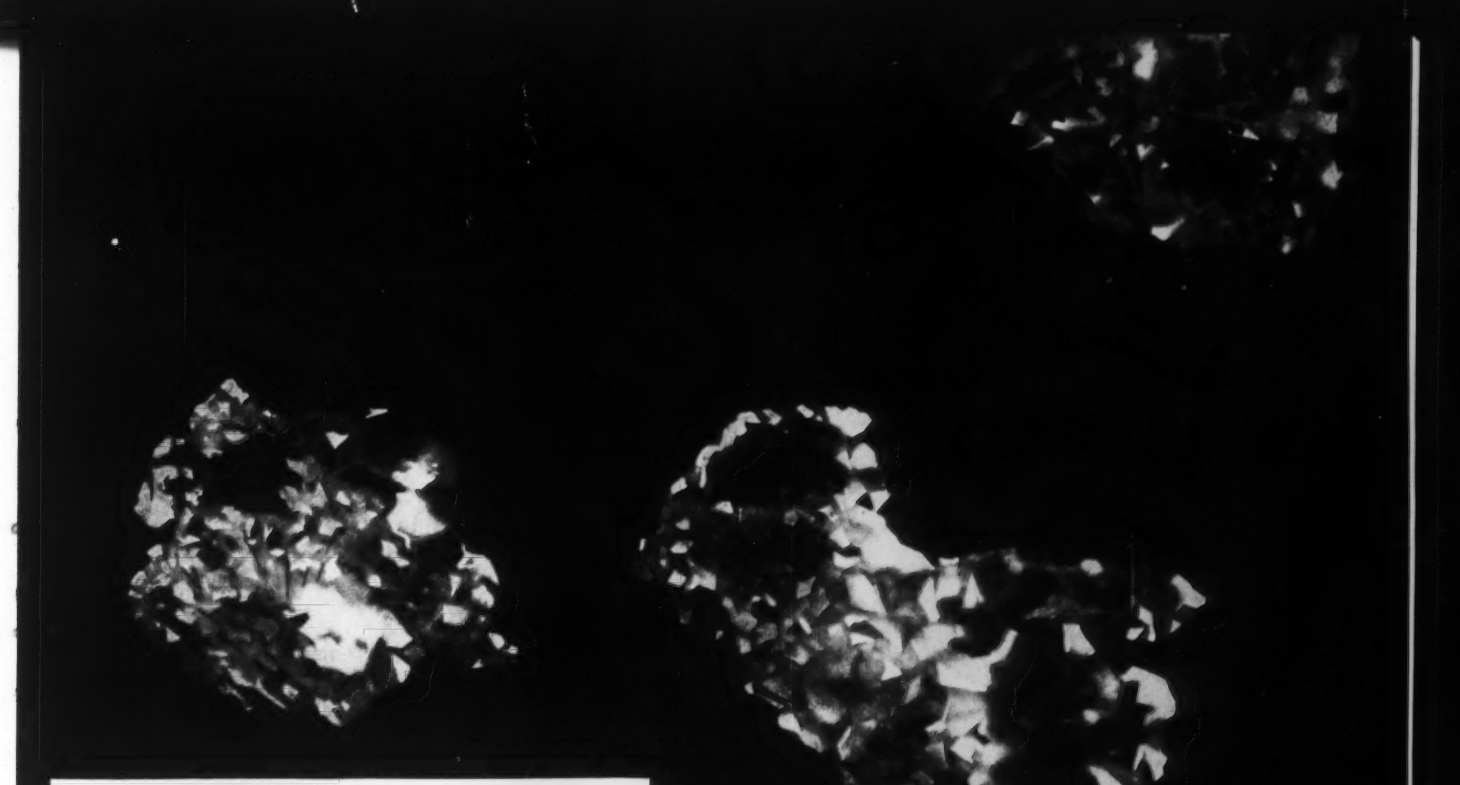
Fig. 4—Proper installation of through-the-side immersion heater

tage), medium heat (half wattage) and low heat (quarter wattage). Most manufacturers make a three heat, through-the-side heater, or any pair of heaters (or multiple of two) can be hooked up for three-heat operation.

Maintenance — With reasonable care, electric heaters for plating baths will give excellent service for a long time. Follow these simple rules to get the most out of them:

1. Keep solution level 3 to 4 in. above heated portion of heater.
2. Provide adequate circulation room around heated portion of heater.
3. Inspect heaters once a week for pitting and corrosion during the first month of operation. Scrape off any accumulation of scale before re-using heater (over voltage can increase wattage and cause scale buildup).
4. Keep solution clear. Don't allow refuse to accumulate on bottom of tank.
5. Keep solution analysis consistent. Foreign matter or evaporation may make the solution injurious to the heater sheath.
6. When heaters are not in use, remove them from the solution and flush them off with clean water. A flexible lead assembly makes removal easy.
7. Seal terminal boxes against corrosive fumes or moisture.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Millions of sharp, superheated particles, (photo shows alumina particles magnified 150x) traveling at high velocities, quickly wear dust collector linings, mains, downcomers, etc. Metals and most ceramics simply can't withstand this harsh abrasion. But some refractories can—even at temperatures as high as 2500°F.

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Wear resistance is not the only unusual property of these refractories. They also offer heat conductivity roughly 11 times that of fireclay, with sufficient hot strength to withstand 25 psi at 1720°C. CARBOFRAX refractories are but one of many super refractories pioneered by Carborundum and offering a wide range of unusual properties.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Wear Resistance". Send for your copy today.

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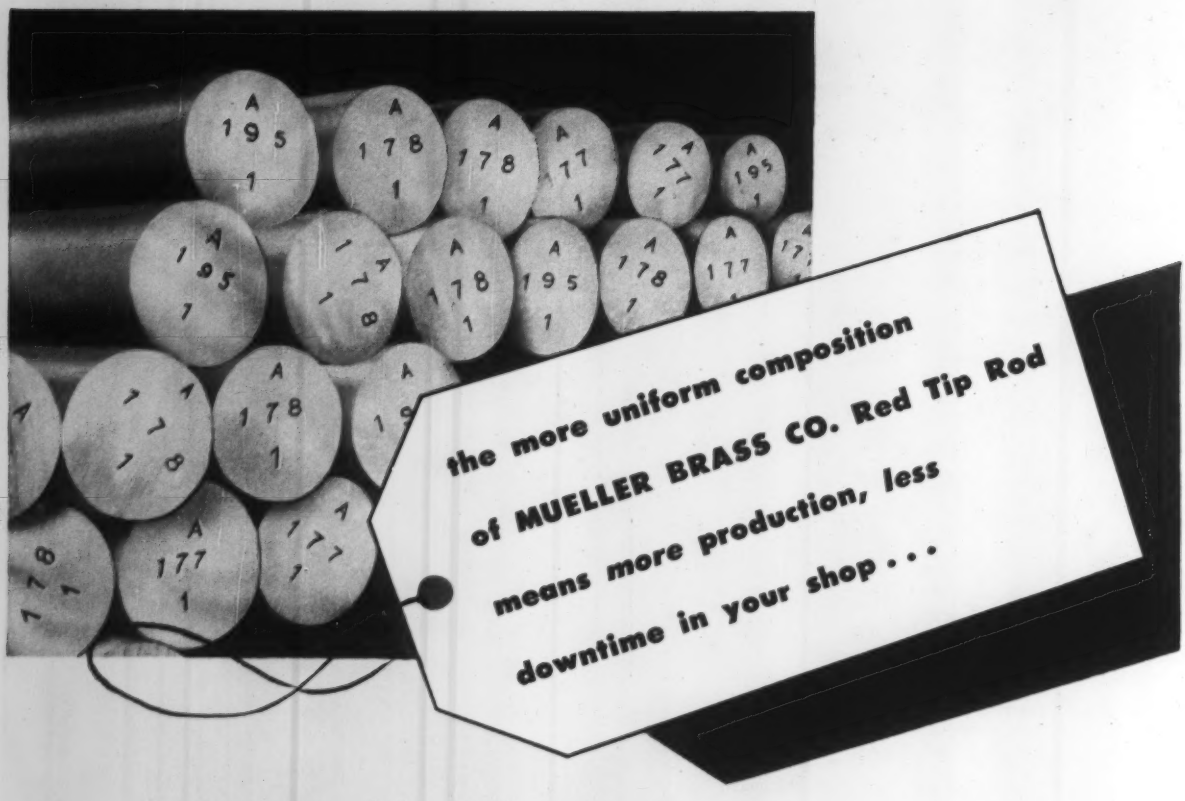
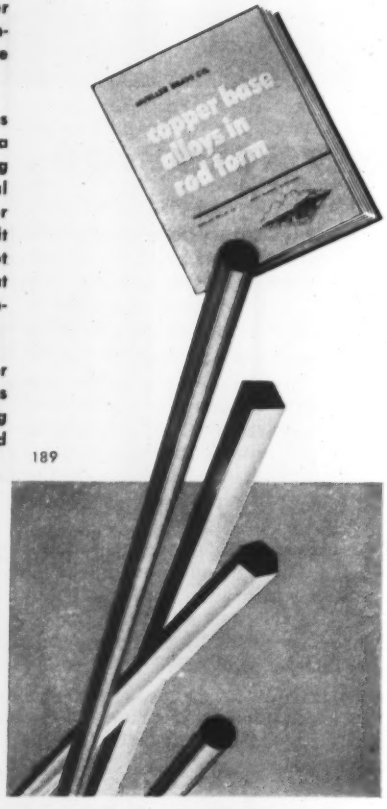


The new semi-continuous process for casting copper alloy billets at Mueller Brass Co. means that the Red Tip Rod you buy is more uniform than ever before. Production tests have proven that rod made under this new automated process has many advantages for you . . . advantages such as faster machining, increased tool life, less downtime and a finer finished product.

The larger volume of metal being cast as a unit in our new process gives us better control of composition. Laboratory technicians keep a continual check on the melt analysis by means of a direct reading spectrometer which takes only 90 seconds to analyze the alloy. Metal is improved through a new cooling process that results in a greater internal soundness. These and many other advanced techniques result in billets (and therefore rod) which are always the same from one lot to another. All billets are stamped and systematically recorded so that each customer rod order can be extruded from billets of uniform composition.

For the next production run on your automatic screw machines, order Red Tip Brass Rod, and see how our new automated process results in more profitable production for you. Write today for Engineering Manual FM-3010, "Copper Base Alloys in Rod Form", for more detailed information.



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MUELLER BRASS CO.

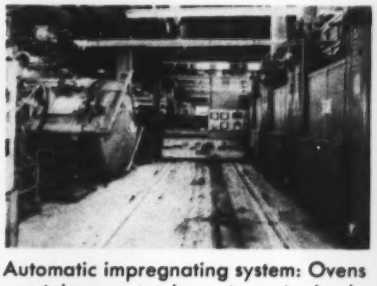
PORT HURON 19, MICHIGAN

Impregnating Unit

Batch impregnating for transformers is automatic. Key to operation is driverless car

POWER and control supplied to moving equipment through automatic take-up reels make possible an automatic batch impregnating system for transformers at General Electric Co.'s specialty transformer plant, Ft. Wayne, Ind.

Key to the operation is a driverless car (12 ft wide by 10 ft 8 in. long) which is remotely controlled through cable reels. The car has six directional motions: Up and down, for picking up or dropping loads; forward and backward, to move loads into or out of the impregnator, rack or ovens; and a transversing motion, to position the car in front of racks, impregnator or oven. Hydraulic power is supplied through automatic take-up reels, made by Gleason Reel Corp., Mayville, Wis.



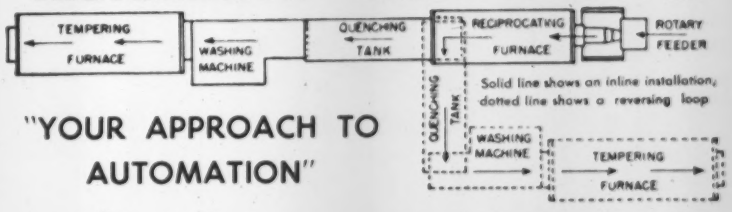
Automatic impregnating system: Ovens at right, car and carriage in background, impregnator at left

Take-Up Reels—A reel carries the control circuits to the mechanism that operates the big impregnator door. There are more reels for retrieving electric cable automatically while carrying control circuits to moving equipment, such as this driverless car. These cables operate relays that control the precise motions of the car.

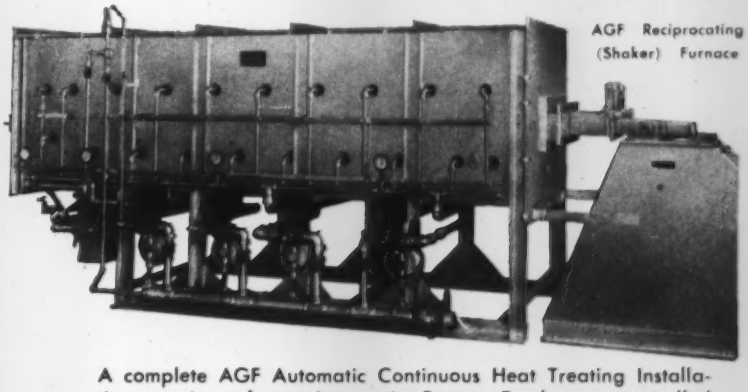
Hose Reels—Besides the electric power reels, Gleason also supplied two automatic dual hose reels to stretch 15 ft of ⅜-in. ID hose, which carries fluid at 1000 psi to operate the hydraulic motors.

The transformer impregnating system was built by Blaw-Knox Co., Pittsburgh. The ovens were built by Young Bros., Cleveland, and the electric controls were designed by the Bristol Co., Waterbury, Conn.

AGF Heat Treating Installation Cuts Costs



"YOUR APPROACH TO AUTOMATION"



AGF Reciprocating (Shaker) Furnace

A complete AGF Automatic Continuous Heat Treating Installation consists of an Automatic Rotary Feeder, a controlled Atmosphere Reciprocating Furnace (illustrated above) and an Automatic Quenching Tank followed by a washing machine and Tempering Furnace.

The output ranges from 100 to 800 lbs. of controlled atmosphere heat treating, quenching, washing and tempering per hour. A wide range of sizes cuts costs; the unit is suitable for a small plant or can be fitted into a production line in a large plant.

The installation can be made either in line or in a reversing loop as illustrated. The reversing loop discharges the work next to the charging end of the furnace and uses a minimum of floor space.

Each part is individually heat treated and quenched as it passes through the reciprocating furnace and quench tank. The disadvantages of batch processing are eliminated.

Flexibility permits handling small as well as large production lots on a continuous basis. Large production lots can be interrupted easily to run small batches of urgently needed work.

Ask AGF Engineers and Metallurgists to recommend the proper AUTOMATIC HEAT TREATING Equipment for your high production and low maintenance.

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Please send us your latest literature illustrating and describing AGF Rotary and Reciprocating Furnaces. Our application will be

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Fairless Works

uses

RESEARCH-COTTRELL PRECIPITATORS

for these gas cleaning jobs

Eleven Research-Cottrell Precipitators, handling 927,160 cubic feet of gas per minute with collection efficiencies of 95% and over, are installed or are being installed at U. S. Steel Corporation's Fairless Works.

Precipitators for blast furnaces and detarring are old, familiar applications for Research-Cottrell. At the end of 1955, 162 blast furnace and 464 detarring precipitators had been installed by Research-Cottrell, including these recent installations at the Fairless Works.

Scarfing and sintering machine applications are fairly recent developments, however. At present Research-Cottrell has installed two scarfing machine precipitators. Five iron ore sintering machine precipitators are in operation, and one more is under construction.

Research-Cottrell has also developed and installed precipitators for electric furnaces, ferromanganese blast furnaces and iron cupolas. For more information on any of these "steel industry" applications contact your nearest Research-Cottrell representative—or write for Bulletin GB.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, N. J.
405 Lexington Ave., New York 17, N.Y. • Grant Building, Pittsburgh 19, Pa.
228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

Scarfing Machines

Two precipitators clean scarfing machine gases (95,000 cfm) from a slabbing mill and blooming mill. Collection efficiency is 95%.

Blast Furnace

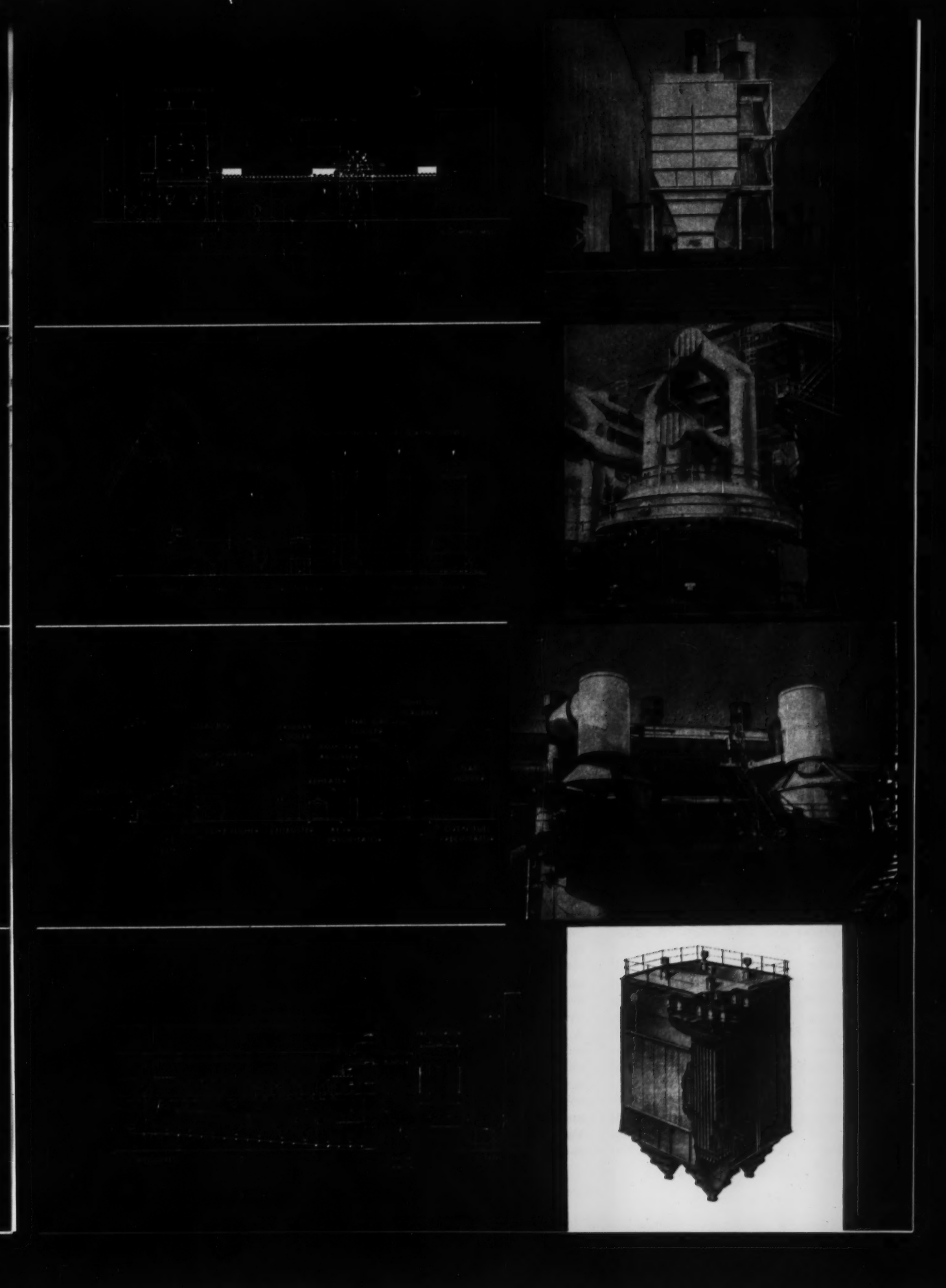
Four precipitators clean gas (330,000 cfm) from two blast furnaces. Efficiency is 95%.

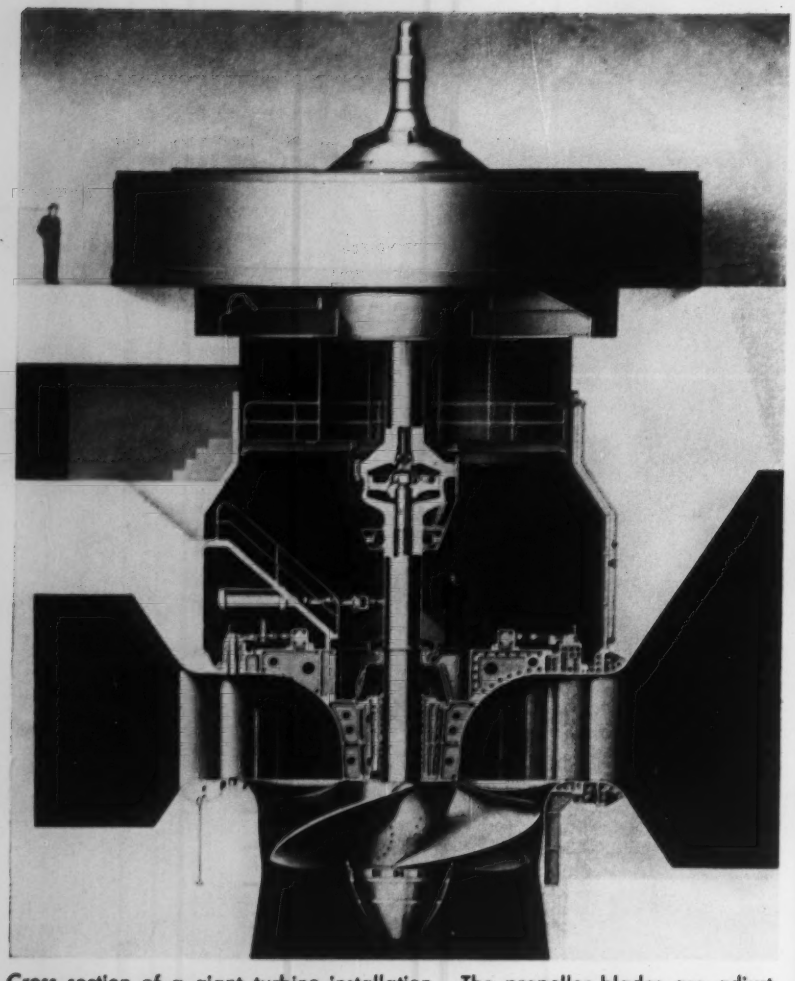
Detarring

Four precipitators clean coke oven gas (62,160 cfm). Collection efficiency is 95%.

Sintering Machines

One precipitator (see cut-away drawing at right) will clean 440,000 cfm of gas from iron ore sintering machine. Collection efficiency of 95% is guaranteed.





Cross section of a giant turbine installation. The propeller blades are adjustable. The outer vertical members are the welded stay ring vanes

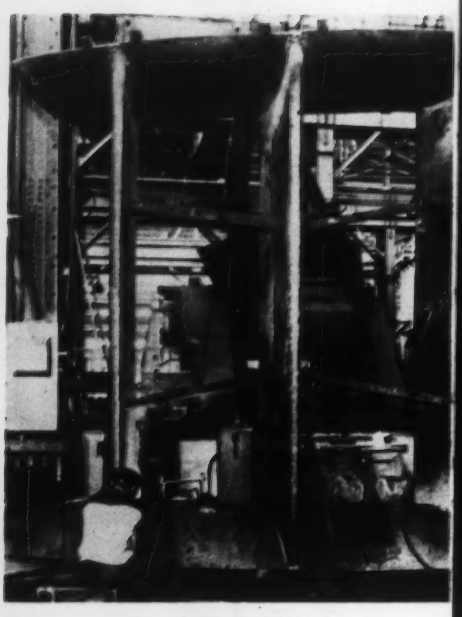
These Turbines Are Welded

ONE-PIECE castings to weldments of cast sections: That's how Baldwin-Lima-Hamilton Corp., Philadelphia, changed its method of making huge, hydraulic turbine runners and stay rings. Results: More foundry production, better quality, easier machining and handling. B-L-H says that its welded assemblies have superior operating characteristics over one-piece castings. And they cost less to produce.

Decision—The first experimental welded turbine runner was completed several years ago. Performance and manufacturing economies led to the welded fabrication of two turbines for the Central Maine Power Co. The runners are used in two, 42,000 hp, Francis type turbines for its Indian Pond plant.

A runner is the rotating member of a hydraulic turbine. Each contains 13 curved blades held between a hub assembly and an outer band. At B-L-H, the crowns are machined, and each bucket is overlaid with stainless steel (Metal & Thermit Corp.'s Murex E-308) which is ground smooth to prevent cavitation.

Old Story — One-piece castings were intricate, expensive to mold and difficult to cast. Difficulties: Porosity and cracks. The fabricated method uses parts cast individually—the crown, band and 13 bucket sections. Each part is finished to template before welding.



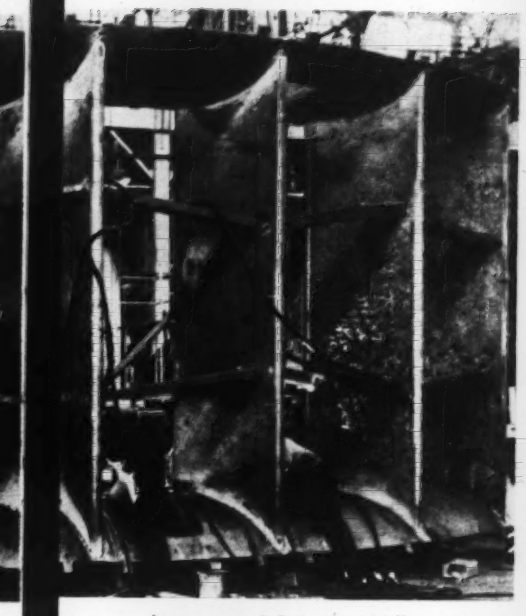
This stay ring assembly used to be a single casting. B-L-H finds that it's

The one-piece runner used to be positioned for the downhand application of the stainless overlay. Since individual buckets can be positioned more conveniently, welding heat deformation can be readily observed and corrected. Thickness of the overlay (¼-in. after grinding) can be more accurately controlled.

Rod—The welding electrode is AWS E-7016. It is a low hydrogen type which minimizes underbead cracking. The arc is easily controlled and provides a spray transfer with low spatter. The weld area is preheated to 200°F and stress relieved at 750°F.

Plates, Too—Turbine stay rings are welded. Plates, not castings, are used. The technique is being used on the stay rings of fourteen 123,800 hp turbines for the U. S. Army Corps of Engineers at The Dalles, Oreg. They are said to be the most powerful adjustable blade propeller turbines in the world.

Stay rings are stationary, circular members supporting the upper structure of the power house. The operating elements of the turbine are mounted inside. They consist of vertical vanes, with top



better to fabricate smaller castings into a larger weldment

and bottom ring sections. They are less expensive to fabricate than castings, can be made to closer tolerances and machined in less time.

Rule—You determine the extent castings may be used in fabrication by the complexity of the structure, its number of identical parts required and relative costs. Baldwin-Lima-Hamilton has found that cast-fabricated designs show up favorably if a small number of parts are required and a complicated pattern setup would be needed for one-piece castings.

Turbine runners like this are also welded from sectional castings. AWS E7016, low-hydrogen electrodes minimize under-bead cracking

Specifying Industrial Gas Meters

WITH the variety of industrial gases in use today and the growing need for metering as a means of gas inventory control, the question arises: "What type meter should be used for each type gas?"

To aid plant engineers and operating personnel, engineers of the Industrial Meter Division, Rockwell Mfg. Co., have come up with this meter check list:

Inert Gases — Practically all inert gases (argon, helium, neon, etc.) can be metered by standard units. Meter capacity will vary from gas to gas due to difference in density; the lighter the gas, the greater the meter capacity must be.

Contaminated Gases — Special precautions must be taken in the construction of meters used for gases with high ammonia, sulphur and moisture content. Otherwise, corrosion of internal meter components will destroy the accuracy of the meter.

Combustible Gases—Since combustible gases are generally lighter than air, it is particularly important that leakproof meter construction be specified for this use.

Oxygen — Meters for oxygen must be constructed so that no oil, grease or dirt can come in contact with the oxygen vapor. Combination of the gas with grease can form a dangerously explosive mixture. Special coatings and other precautionary steps are required in the manufacture and assembly of this class meter.

Sewage Gases—Because of the high sulphur and water content of sewage gases, meter parts must be of special materials, or must receive protective treatment prior to assembly.

LP Gas—With the exception of the diaphragm dressing, standard meters are used to measure liquefied petroleum gases. Propane and butane tend to leach from the standard leather diaphragms, so special oil-treated leather or synthetic materials are used in these meters.

Gases That Need Special Meter Construction:

TYPE	CONDITION WET (0.2%)	CONDITION DRY	CONSTRUCTION SPECIFICATION	DIAPHRAGM SPECIFICATION
Ammonia	x	x	Any but brasses and bronzes	Synthetic
Carbon dioxide	x	x	All satisfactory	Leather or synthetic
Chlorine	Cannot be metered	x	All satisfactory	Natural rubber
Coke oven	Tar must be removed		Special handling	Special oil-treated leather
Freon		x	All satisfactory	Leather or synthetic
Freon	x		All but iron and steel	Leather or synthetic
High sulphur	x	x	All but brasses and bronzes	Synthetic
Hydrogen sulphide		x	All but brasses and bronzes	Synthetic
Hydrogen sulphide	x		All but iron and steel	Synthetic
Sulphur dioxide		x	All satisfactory	Butyl rubber

Design Awards

Arc welding contest is for undergraduates

TWO competitions for undergraduate college students have been announced by the James F. Lincoln Arc Welding Foundation, Cleveland. The foundation will award $5000 to students or scholarship funds for designs which make the best use of arc welding in machines or structures. First prize in both contests is $1250; the winners' schools will also receive recognition.

Any resident undergraduate engineering student is eligible. Write: James F. Lincoln Foundation, Cleveland 17, O.

6 good questions about aluminum MACHINING

...and 6 good answers by Kaiser Aluminum Distributors

If you have a problem in machining aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of Kaiser Aluminum's field staff.

Here are the answers given by Kaiser Aluminum Distributors on specific machining questions asked by fabricators in various parts of the country. Questions such as these may also be bothering you.

Q. What is the recommended tooth spacing for band and hack saws for use in sawing aluminum?

A. In band saws, a tooth spacing of 4 to the inch is best for heavy sections. This allows ample room for chips without clogging or binding. Finer tooth spacing, up to 14 per inch, is recommended for thin stock. For hack saws, wavy set blades with about 5 to 15 teeth per inch are used extensively in cutting aluminum. For fine work, blades with much finer teeth can be employed.

Q. What are the best types of abrasives for grinding aluminum?

A. A free cutting silicon carbide in a flexible base is generally preferred. Aluminum oxide is not recommended except in certain abrasive belt applications and cutoff wheels. The wheels of medium hardness of about 30 grit in a synthetic resin bond have been found to work most successfully in roughing work. For finishing, a finer grit, up to about 54, in a vitrified bond is popular.

Q. Which aluminum alloy has the best machining qualities for automatic screw machine operations?

A. Various aluminum alloys can be easily worked on automatic screw machines. The principal alloys for such use are 2011-T3, 2017-T4, 2024-T4 and 6061-T6. Of these alloys, 2011-T3 is considered to have the best machining qualities. This general purpose alloy is specifically made for a broad range of screw machine products.

Q. What are recommended top rake angles for the common screw machine grades of aluminum?

A. The recommended top rake angle for screw machine form tools when machining 2011-T3 aluminum alloy is 0° to 3°. This angle is best also for breakage of chips and controlling diameters. For other aluminum alloys such as 2017-T4 and 2024-T4, 5° to 10° is recommended. Although large rake angles do promote free cutting, some difficulty may be experienced in controlling the finished diameter. The correct rake angle depends on the feeds and speeds of the particular operation. The exact rake angle is not so important for machining aluminum as for some other metals.

Q. Our reaming operations with aluminum have resulted in too much burnishing. How can we correct this?

A. A definite cutting action is necessary in reaming aluminum. Reamer life is also shortened when there is an insufficient amount of stock to be removed. If the drill is too near the reamer size or cuts oversize, the reamer will not have enough bite and as a result may work harden or burnish the sides of the hole. The tendency in such a case is to wedge rather than cut, resulting in reamer wear or breakage. Therefore, holes should be approximately 0.006 to 0.016 inch undersize.

Q. What are the recommended point angles for drills used in drilling aluminum?

A. The point angle can be altered according to the hardness of the alloy being worked and the type of operation. The harder the materials, the flatter the point of angle. For most aluminum alloys, the included point of 116 to 118 degrees as supplied on the standard drill should be increased to 130 or 140 degrees. For ease of penetration in high-silicon-aluminum alloys, a drill having a point of approximately 90 degrees is advisable. A 60 degree angle can be used for softer alloys.

* * *

For the *right* answer, ask your Kaiser Aluminum Distributor

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your Kaiser Aluminum Distributor is ready to give you instant assistance.

Naturally, you can always depend on him for prompt service in supplying you with aluminum cut to your specification *as you need it*. Take advantage of the personalized service and technical know-how offered by your Kaiser Aluminum Distributor. Call him today!

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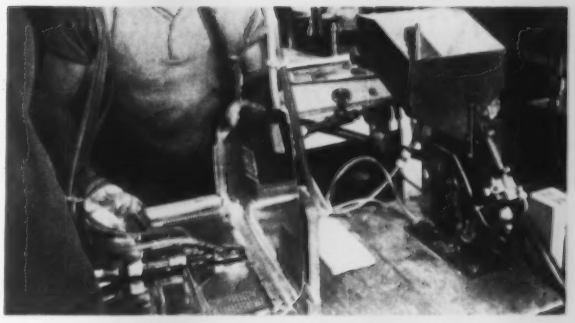


Screws feed from hopper through plastic tube to Pneuma-Serve screw driver

Feed Cures Screw-driving Ills

WHEN Stewart Waterworth, production manager at Modern Tool & Die Co., Cleveland, put down the telephone handpiece, he had a problem. Philco had just asked him to double production on portable TV cabinets.

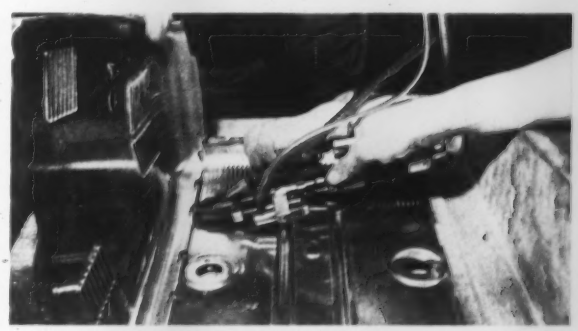
Modern Tool makes the entire cabinet—stamping, forming, finishing, assembly. Its stamping and shaping presses could double their output. The conveyorized spray painting and drying operation could be speeded up. Assembly was the bottleneck.

Close Quarters—Design of the cabinet required each side to be fastened to the top with seven sheet-metal screws and J-type Speednuts. Mr. Waterworth figured it would take six more workers with screw drivers (he'd been using two) to keep up with the rest of the shop.

But he had another idea up his sleeve. He located a hopper fed automatic screw driver with an offset head. It drives Phillips screws as fast as an operator can place the nuts. With the tool, a two-man team can install almost 500 fasteners an hour in cramped quarters.

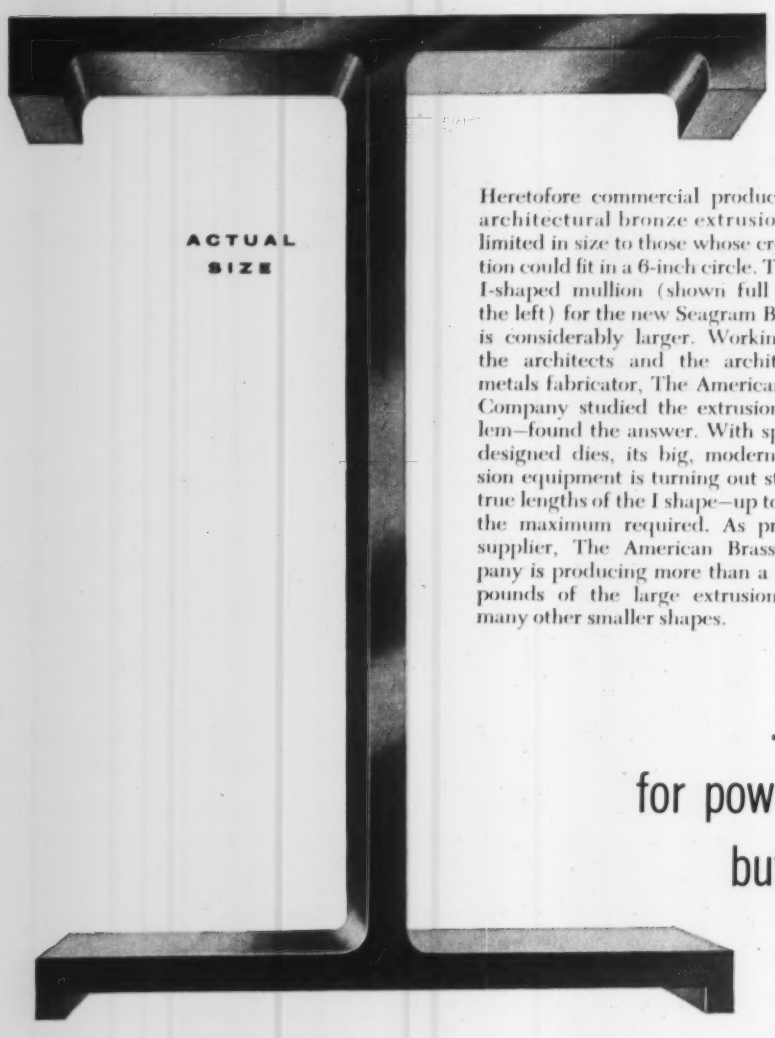
Another Job—It would be stretching fact to claim that this was sudden inspiration. The company had discovered the Pneuma-Serve screw driver on an earlier job. With its help, a muffler assembly operation jumped from 1100 to 2500 units a day while costs dropped from $32 to $21 a thousand. Modern might have been thinking about that when it bid on the Philco job.

Philco got the cabinets on time.



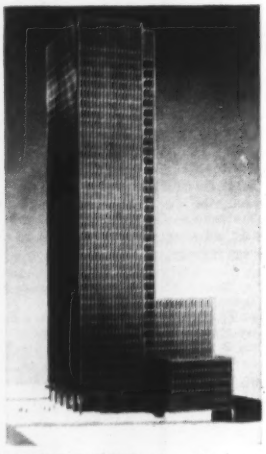
Here No. 6 x ⅜-in. Phillips round head type A screws are being driven through prepunched holes into J-type Speednuts

From the largest architectural bronze shape for this building . . .



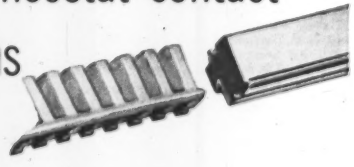
ACTUAL SIZE

Heretofore commercial production of architectural bronze extrusions was limited in size to those whose cross section could fit in a 6-inch circle. The new I-shaped mullion (shown full size at the left) for the new Seagram Building is considerably larger. Working with the architects and the architectural metals fabricator, The American Brass Company studied the extrusion problem—found the answer. With specially designed dies, its big, modern extrusion equipment is turning out straight, true lengths of the I shape—up to 26'4", the maximum required. As principal supplier, The American Brass Company is producing more than a million pounds of the large extrusions, and many other smaller shapes.

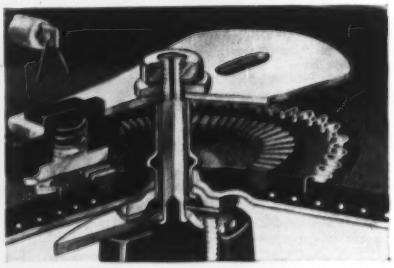


WORLD'S FIRST. The 38-story Seagram Building, now rising on Park Avenue in New York, is the first to use architectural bronze for the metal in its "curtain" walls. The large extrusion at the left forms the vertical mullions extending the full height of the skyscraper.

. . . to small extrusions for power rheostat contact buttons



Though not the smallest, the extruded shape, shown full size above, is typical of the hundreds of smaller industrial shapes produced by Anaconda. This extrusion has helped the Ward Leonard Electric Company, Mt. Vernon, N. Y., cut the cost of assembling its Vitrohm power rheostats.



COST CUTTER. Before using extrusions, Ward Leonard hand-assembled individual brass contact buttons—spacing them on a steel wire to hold in position while vitreous enamel was fired. The steel wire was then ground off. Now an extruded brass shape is accurately slotted, leaving a continuous line of buttons attached to a triangular projection. After firing, the projection is easily milled off. Ward Leonard gets absolute uniformity, with less effort and fewer rejects—and healthy savings.

ANACONDA has the experience and the modern equipment to make copper and copper alloy extrusions in a tremendously wide range of sizes and shapes — as indicated by these two examples. Imagination applied to the design and use of extruded shapes can cut direct labor costs — reduce machining operations — cut scrap — give improved product quality. For more information or help with your specific problems see your Anaconda representative. Or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5671

ANACONDA®
Extruded Shapes

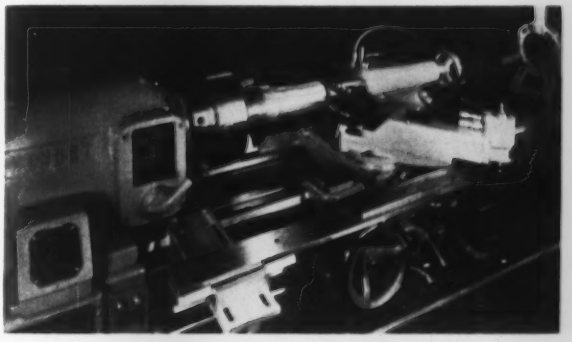
Hydraulic Tracer Does Production Turning

The No. 2E general purpose lathe is adapted to production turning jobs by the hydraulic tracer attachment.

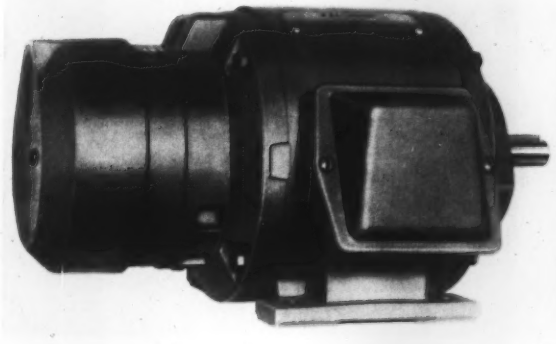
Use of a flat template is economical on runs of three or more pieces.

The lathe's stepless speed control and tracer turning combine to give good surface finish.

The ability to change speeds when the spindle is under load enables the machine to turn at a virtually constant surface speed—the operator controls an electronic drive which is infinitely variable from 15 to 1500 rpm. *Write*: Hendley Machine Division, Barber-Colman Co., Rockford, Ill. *Phone*: 4-7871



Brake Motors Stop Instantly and Hold Heavy Loads



These rugged, cast iron brake motors are used on all types of equipment, from bottlewashing machinery to heavy duty cranes. The line has a torque range of 3 to 345 lb-ft.

Features include one-piece molded friction linings for quick stops and one-operation torque setting.

In case of power failure or low voltage, "dead man" operation sets and holds the load until normal operating conditions are restored.

All types of enclosures are available including those suitable for outdoor installation or where moist, corrosive or abrasive dust conditions prevail. *Write*: Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, O. *Phone*: Glenville 1-3530

Railroad Car Protects Coiled Steel

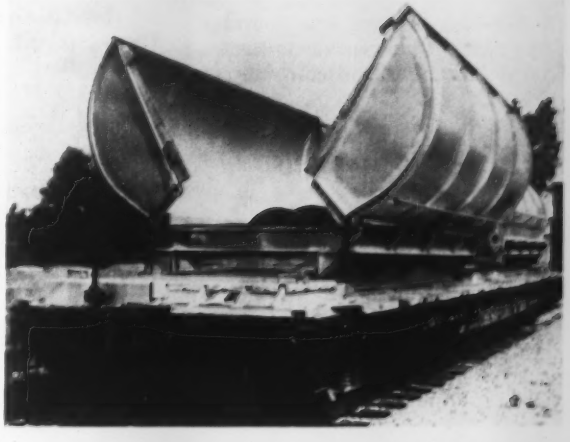
Damage caused by load shifting, impact and weather is eliminated by this coil car.

Dunnaging and shrouding are not needed. Loading and unloading times are reduced.

Two cylindrical metal shells are fitted lengthwise to a standard flatcar. One man can crank open the cylindrical encasement in 45 seconds.

Shells handle coils of rolled sheet steel up to 7 ft in diameter. They are locked horizontally with wood-cushioned cross members into a V-shaped floor seating which is 1½-ft deep.

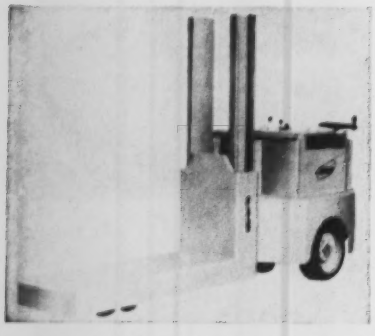
Vertical, shutter-type doors at the ends of the shells swing back easily. This provides increased clearance, enables the load to be inspected without opening the shell and allows easy access to manifest sheets and lading bills. *Write*: Evans Products Co., Plymouth, Mich. *Phone*: 1680



NEW PRODUCTS and equipment

Platform Truck

The E13-10 can carry 10,000 lb and operate under rugged handling conditions. Its frame is welded heavy steel plate. All major units are attached directly to the heavily reinforced alloy steel bars which form the center sill structure.



The high-lift truck has two-wheel drive and six-wheel steer. A hydraulic lift cylinder operates the platform. A check valve is built into the lift cylinder to prevent the load from dropping suddenly should the system rupture at any point. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Backstand Idler

The L-610 can be adjusted for all types and weights of belts from ½ to 6 in. wide which are used on grinding and polishing lathes.

Telescoping remote control arms and universal joints permit the mounting of both tracking and tension arms at any position. A single tracking control arm operates a patented linkage which makes lateral and radial adjustments of the pulley. Belt tension is adjusted by the other remote control arm.

The base of the idler assures belt wrap-around at the proper position on the contact wheel. *Write*: Fenlind Engineering Co., 5602 Pike Rd., Loves Park, Ill. *Phone*: 7-5717

Automatic Lubricator

The AP-3 is for machines where some bearings require periodic lubrication and others need oil continuously.

It consists of two independent gear pumps with a common drive gear which is mounted in a single housing. Both pumps draw oil from a common reservoir in the bottom of the housing. Oil is fed through separate distribution systems.

At each lubrication point, exact quantities are filtered, measured and fed to each bearing.

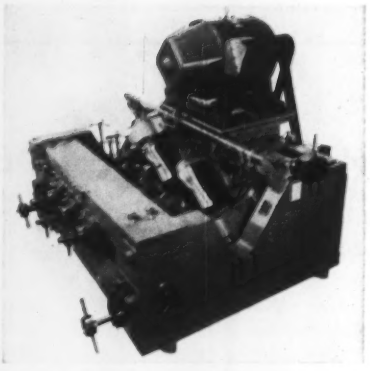
Pressure periods range from 5 to 30 minutes. Pressures are 25 to 150 psi.

A constant volume pump feeds oil through the continuous branch. Pressures are from 7 to 50 psi. *Write*: Service, Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J. *Phone*: Diamond 2-8850

Pipe Straightener

Model 2JM will straighten steel or nonferrous pipe and tubes at production speeds up to 1000 fpm.

Rolls are positioned for a horizontal pass line (the 5-roll principle is used). A pressure roll is located between two sets of opposed rolls. Each set has one opposed driven roll and one idler roll.



Longitudinal positioning of pressure rolls, together with angular adjustment of all five rolls, makes it possible to do accurate end-to-end straightening over a wide range of sizes.

Floor space requirements are kept to a minimum by mounting the motor on top of the machine. *Write*: Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa. *Phone*: Grant 1-8077

Protective Coating

Bakekote is a thermosetting resin that protects copper or brass finishes. It forms a tough, adherent, elastic film which provides maximum gloss, flexibility, chemical and abrasion resistance.

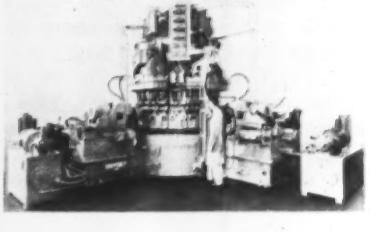
Metals coated with it can be drawn, press formed, stamped, roll formed and seamed. The protective film does not peel, crack or flake. *Write*: American Nickeloid Co., Peru, Ill. *Phone*: Peru 373.

Center Column Machine

This 16-station machine has a seven-sided column that resists high machining thrust loads.

The machine drills, countersinks, chamfers and reams 331 ball nuts for automotive steering gears an hour.

The unit, including control



IS YOUR BUSINESS GROWING?

If it is, then your FILES must be growing at a proportionate pace! But HOW are they keeping pace? Is your index system inflexible, outmoded, wasteful? Are additional filing cabinets eating up more and more valuable floor space? Here are 2 products—exclusives of Remington Rand—that are engineered expressly to meet those "growing" needs!

VARIADEX®—Scientifically developed alphabetic filing—permits UNLIMITED *file expansion without waste.* Your files grow automatically as your business grows . . . completely eliminating costly waste of discarded indexes and laborious reindexing. *But that's not all . . .* VARIADEX color coding cuts reference and finding time as much as 80%! VARIADEX—as modern as tomorrow.

KOMPAKT—the revolutionary new line of files—gives you an extra drawer in every file. You can save up to 50% of your costly filing floor space ($3-$6 per sq. foot!) . . . for example, by replacing 4-drawer files with 6-drawer KOMPAKT files—and you'll still find the top drawer readily accessible. And KOMPAKT has superior construction, smoother operation and beautifully streamlined appearance—as modern as tomorrow.

Get full particulars on these TIME-SPACE-MONEY-SAVING products. . . . write Room 2245, 315 Fourth Avenue, New York 10. Ask for LBV666—"VARIADEX" and LBV676—"KOMPAKT."

Remington Rand

DIVISION OF SPERRY RAND CORPORATION

MORE OF THE GARLOCK **2,000**

Teflon*-Jacketed Gaskets for Chemical Resistance Plus Resiliency

Here is the ideal gasket for joining glass piping, glass-lined steel piping and light metal flanges on processing equipment. Teflon-jacketed gaskets with fillers give you resiliency and deformability impossible to obtain with solid Teflon gaskets. Fillers are available of practically any gasketing material for use in each of the four basic designs indicated at the right.

Teflon-jacketed Gaskets are only a part of the Garlock products available in Teflon . . . and only a fraction of the famous "Garlock 2,000", two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the only complete line. It's one reason you get unbiased recommendations from your Garlock representative.

4 Basic Designs

1 Slit-center. Teflon is slit from outside diameter to within 1/16" to 1/8" of the inside diameter. Any type filler can be used.

2 Milled-center. Machined from outside diameter. Provides flat surface flush with pipe I.D. reduces impedance to flow.

3 Formed Shield. For large or irregular openings such as elliptical manholes.

4 Double Jacket. Two jackets overlapping to protect both O.D. and I.D. Filler of compressed asbestos between layers of soft woven asbestos commonly used.

Write for new Catalog AD-154 which describes Garlock Teflon Gaskets and Sheets.

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U. S. and Canada.

*DuPont's Trade Mark for its tetrafluoroethylene resin

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints

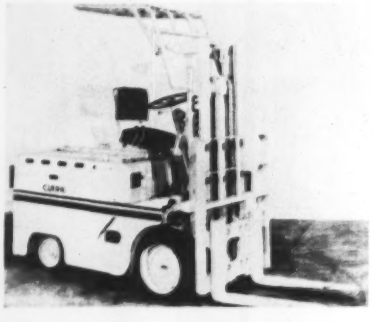
NEW PRODUCTS and equipment

panel, occupies 24 x 26 ft of floor space. The index table is 96 in. in diameter.

The machine weighs about 50,000 lb, develops 181 hp and delivers 150 gallons of coolant a minute. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123

Fork Truck

The EUT-8024 is an 8000-lb capacity lift truck with dual drive wheels. It will travel at 5.5 mph loaded and climb a 10 per cent grade. It has four speeds forward, four in reverse.



The truck can stack loads 48 in. long at right angles to aisles 148½-in. wide.

Weight of the truck is 11,580 lb with a lead acid battery, 11,378 lb with an alkaline battery. *Write*: Electric Truck Section, Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Welding Electrode

Jetweld LH-70 combines low hydrogen advantages with those of iron powder electrodes. The deposition rate is high; slag removal is easy; and operating characteristics are good.

For general purpose welding of all steel, high currents can be used. Other uses: Welding crack-sensitive steels and those that tend to produce porosity in the weld metal.

Either a drag or short arc technique can be employed. The electrode is classified as E-6016 but also meets the requirements of

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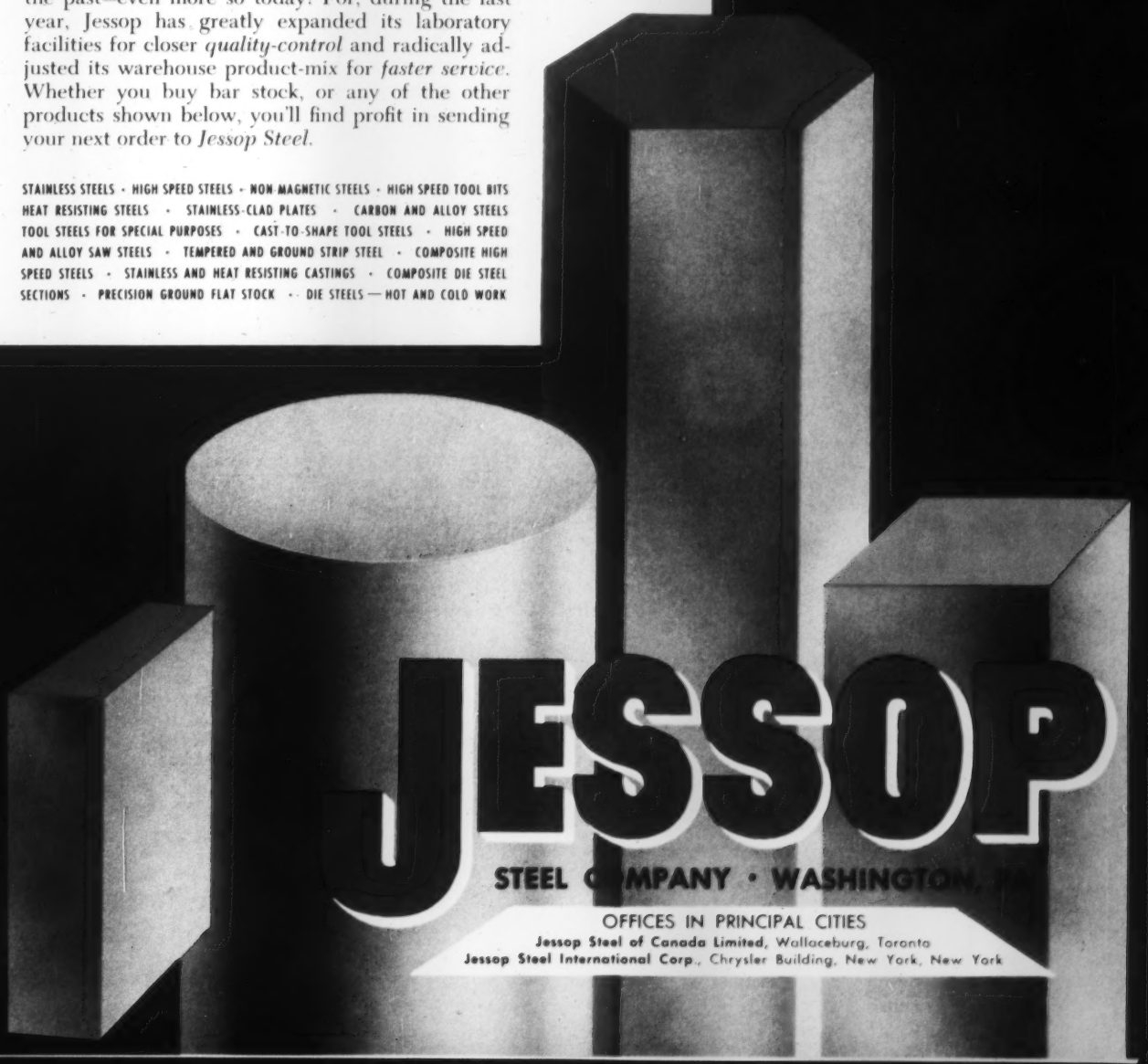
HIGH QUALITY*

GOOD SERVICE*

* *High quality* and *good service* are apt words to describe what you get when you buy tool and high-speed bar stock from *Jessop Steel*. Descriptive in the past—even more so today! For, during the last year, Jessop has greatly expanded its laboratory facilities for closer *quality-control* and radically adjusted its warehouse product-mix for *faster service*. Whether you buy bar stock, or any of the other products shown below, you'll find profit in sending your next order to *Jessop Steel*.

STAINLESS STEELS · HIGH SPEED STEELS · NON-MAGNETIC STEELS · HIGH SPEED TOOL BITS · HEAT RESISTING STEELS · STAINLESS-CLAD PLATES · CARBON AND ALLOY STEELS · TOOL STEELS FOR SPECIAL PURPOSES · CAST-TO-SHAPE TOOL STEELS · HIGH SPEED AND ALLOY SAW STEELS · TEMPERED AND GROUND STRIP STEEL · COMPOSITE HIGH SPEED STEELS · STAINLESS AND HEAT RESISTING CASTINGS · COMPOSITE DIE STEEL SECTIONS · PRECISION GROUND FLAT STOCK · DIE STEELS — HOT AND COLD WORK



JESSOP

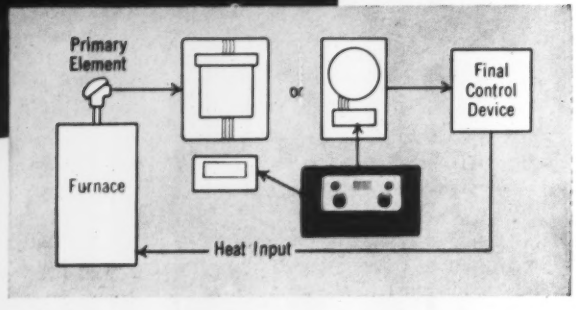
STEEL COMPANY · WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York

This control relay is the heart of the new Series 60 electric proportioning control system . . . which also includes a Speedomax® indicator/recorder, a primary element and a final control device.



WITH THIS NEW SERIES 60 CONTROL

You can push your furnace HARDER

■ If you're wasting valuable furnace time bringing a *batch* to temperature . . . slowing down heating rate to prevent overshoot . . . Series 60's adjustable rate of approach will bring furnace to control point smoothly—safely—in shortest possible time.

If you're losing production on your *continuous* processes due to hot spots . . . slow start-ups . . . poor combustion, Series 60's sensitivity, speed of response and control actions will provide fast, uniform heat distribution within the furnace . . . head off temperature departures as soon as they start.

Regardless of your process, if your furnace, your product and your production isn't benefiting fully from your present controls, it'll pay you to look into Series 60.

COMPLETE, FLEXIBLE SYSTEM Heart of this flexible system is L&N's new, compact Series 60 electronic proportioning control relay which receives information from the Speedomax indicator/recorder . . . immediately amplifies it and adjusts the final control device to hold temperature in line. This control relay is only 6″ x 11″ x 11″—about half the size of the Series 50 unit which it replaces. It's an integral part of our new Speedomax H instruments . . . mounts in its own case when used with Speedomax G. Expendable components—tubes, electrolytic capacitors, etc—are plug-in for fast servicing.

VARIETY OF CONTROL ACTIONS Series 60 is available for Position-Adjusting Type (P.A.T.) or Duration-Adjusting Type (D.A.T.) control.

P.A.T. regulates input by adjusting the position of a valve; D.A.T. provides a two-position operation of the final control device . . . regulates input by adjusting the durations of heat-on time of a contactor, or of full-open time of a valve.

P.A.T. is supplied for single-action (proportional) or 3-action (proportional, reset and rate) control . . . D.A.T. for two-action (proportional and reset) or 3-action control. Proportional regulates input according to *size* . . . reset according to *duration* . . . and rate according to *speed* of temperature change. Choice of type depends upon your product, your process and your production.

In the 3-action units, reset and rate operate independently—permit optimum settings for best possible control. Reset is adjustable from 0-100 repeats/min; first step above zero is .01. Rate time is continuously adjustable from 0-8 minutes.

For a full description of Series 60 control, contact your nearest L&N office, or write 4957 Stenton Avenue, Philadelphia 44, Penna.

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instruments *automatic controls • furnaces*

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What's your pleasure? Fabulous roast beef in Cleveland's first specialty restaurant The Rib Room. Dancing to a famous orchestra in the smart Bronze Room. Relaxing over a drink in the stag Men's Bar. You'll find something to suit every taste and mood at Hotel Cleveland.

And you're in the very heart of town, close to business, shopping and theaters ... directly connected with Union Passenger Terminal.

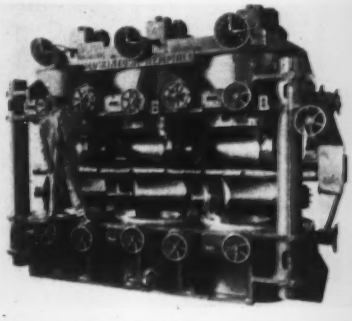
NEW PRODUCTS and equipment

classes E-6015, E-7015 and E-7016. Sizes: ⅛, 5/32, 7/32 and ¼-in. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O. *Phone*: Ivanhoe 1-8100

Pipe Straightener

The three-post design used on the A-5 makes it easy to adjust and maintain.

Pipe from 16 to 65 ft long and 4¼ to 16 in. in diameter can be straightened at speeds of 60 to 240 ft a minute.



The need for support posts is eliminated. *Write*: Mackintosh-Hemphill Division, E. W. Bliss Co., Pittsburgh 3, Pa. *Phone*: Hemlock 1-3000

Grease Gun

This high pressure lever gun uses handy 14½-ounce grease cartridges. They provide fast, easy reloading without waste or mess.

The gun is equipped with a filler nipple for 30-second refilling by a filler pump, or by the conventional suction method.

All normal pressure gun lubricants can be handled in any weath-

MUNDT PERFORATED METAL MEANS PERFECT SCREENS

Specially Fabricated for ALL INDUSTRIES BY

CHARLES MUNDT & SONS

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JERSEY CITY 4, N. J.
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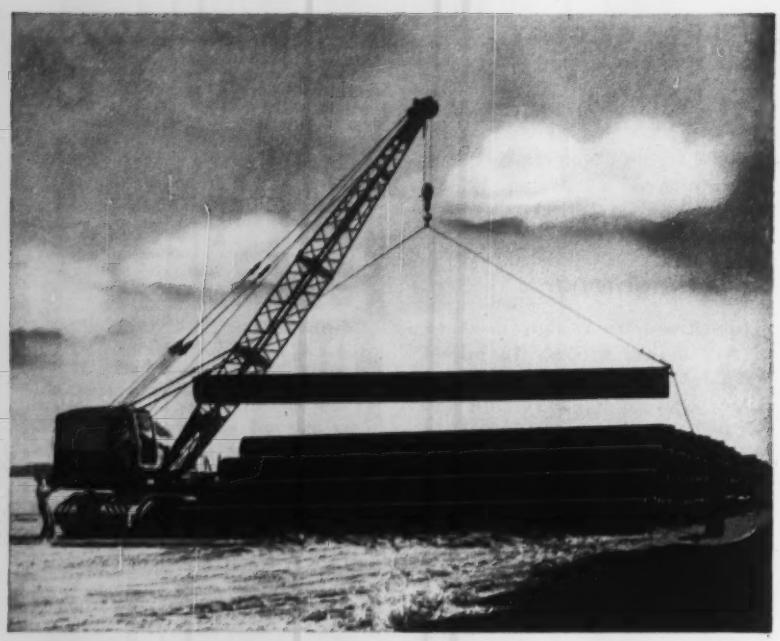


How TRANSIT CRANE features can cut your handling costs

Material handling is more economical with Transit Cranes because these mobile machines have *more* of the features you need *most* to bring savings all down the line. Here are a few of these features and what they can mean to you on material handling jobs.

POWER CONTROLLED LOWERING for main hoist line on lifting crane permits delicate positioning of loads.

FRICTION SWING BRAKE, in addition to regular swing lock, permits more accurate spotting and holding of boom point over desired position.

INDEPENDENT BOOM HOIST WITH POWER CONTROLLED LOWERING provides extreme accuracy in load handling by enabling operator to boom up or down at any phase of the cycle.

SAFETY BOOM STOPS on lifting cranes are designed to prevent boom from accidentally snapping over center and striking cab.

PENDANT-TYPE BOOM SUSPENSION with 8 parts of operating line between bridle and boom point is ideal for changing boom lengths conveniently.

Transit Cranes are available in two sizes — the 15-ton 15-B and 25-ton 22-B. Ask your nearby Bucyrus-Erie distributor for full information on the size machine that will best serve your needs.

247E56

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

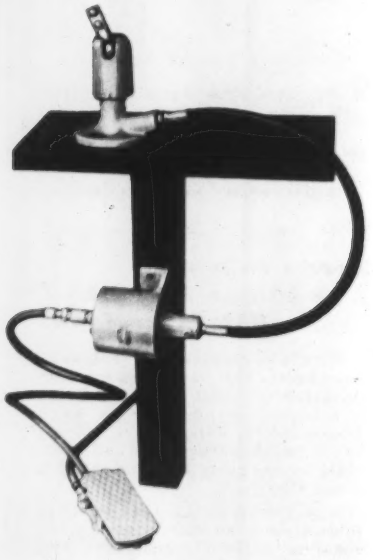
NEW PRODUCTS and equipment

er. The gun develops maximum pressure of 10,000 psi. *Write*: Lincoln Engineering Co., 5702-33 Natural Bridge Ave., St. Louis 20, Mo. *Phone*: Evergreen 3-5900

Work Positioner

Model 393 PowRarm is an air powered hydraulic device that instantly positions workpieces to any desired angle. Both of the operator's arms are left free.

The unit can be installed quickly on any bench or work station. It consists of a work positioner, air-hydraulic booster cylinder, foot pedal control and the necessary hoses and fittings.



Locking force is supplied by the hydraulic cylinder which uses 60 to 100 psi of air.

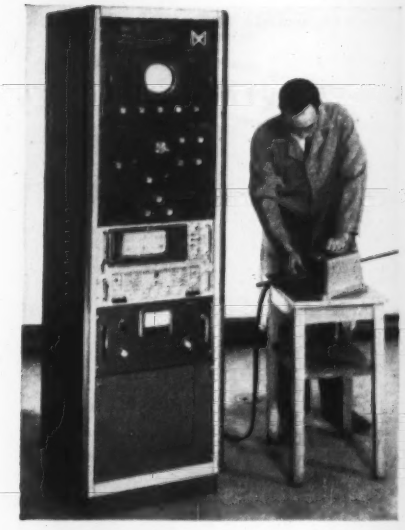
Work capacity is 105 lb with 100 psi input. *Write*: Wilton Tool Mfg. Co. Inc., Schiller Park, Ill. *Phone*: Gladstone 5-6600

Metal Cleaning

Cleaner 26 is an organic emulsion that removes heavy oils, greases and solids. It also removes buffing compounds and cleans heavy machinery, airplane bodies, truck bodies and floors.

De Ruster 2 is an alkaline salt mixture which is mixed with water and used nonelectrolytically at

Case Studies:
NONDESTRUCTIVE TESTING SYSTEMS

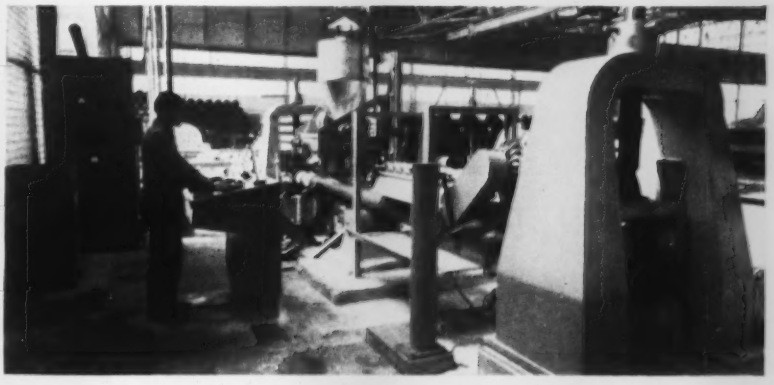


The MAGNATEST FW-400 Series is electronic, eddy current equipment for non-destructive testing of non-magnetic rod, wire, or tube from 1/64" to 3" diameter. The test is fully automatic and can run at high mill rates (up to 400 and 500 f.p.m.). With the FW-400 such problems as seams, cracks, concentrated porosity, inclusions, stringers, laps, and splits may be detected at the level required. Diameter variation, embrittled areas, and scale are other conditions found with the unit.

SEMI-AUTOMATIC MAQ 1694 MAGNA-FLUX. Unit speeds end inspection for rod mills. A special conveyor extension carries short coil-end samples through a Magnaglo bath. They are then magnatized automatically and pass on to the curtained "black light" booth where defects, if any, show up as glowing indications on the rod ends. The Rate: 15 per minute. This system has cut inspection time in half and has eliminated the need for most acid etching equipment at several mills.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

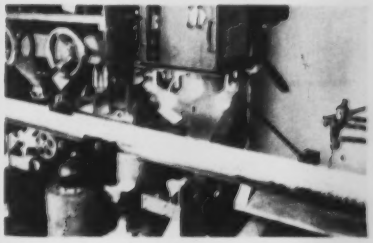
Write for complete details concerning any of the above case studies or other tests in mills. Also, ask for our new booklet on "Lower Manufacturing Costs."



This picture shows the first new fully automatic Magnaflux PYQ equipment used in a steel mill on pipe weld testing. The man operates the mill itself, the Magnaflux unit uses photoelectric inspection.

New Methods Developed for Mill Tonnage Testing

Nondestructive testing has grown from a "sometimes" thing to a full time production tool in many mill operations. New techniques and methods have been developed for every type inspection. Whether the mill produces rods, tubes, rounds, squares, bars or billets, M offers semi or fully automatic inspection systems for practically every need. For instance, the type of defect most commonly found in resistance welded steel line pipe is longitudinal cracks in the weld. As shown in the illustrations above and at the right, such cracks can now be detected automatically right after welding. The crack is spray-marked on the pipe. This is done at production line speeds and without operator optical fatigue factors.



This unit tests pipe welds at rates over 100 ft. per minute. Magnaflux indications of defects are formed at location #4 in photo above. The new SN-100 Series photoelectric scanner automatically "sees" these defects at #5 area. This actuates #6 spring, wherever crack is present — to mark defect with paint.

MAGNAGLO INSPECTION VARIES TO FIND *ONLY* WHAT YOU WANT TO SEE!

After you decide what constitutes your own serious flaw, Magnaglo can help you achieve consistent quality in production. The magnetizing current and Magnaglo application can be varied and controlled to produce exactly the degree of sensitivity required for your quality standards. The photos above show the same billet inspected under varying techniques and amperages, to suit different billet conditioning needs.

Note: variance of intensity of the Magnaglo indications. You can show or not show any depth seam you require, for each job you run.

Zyglo can be similarly employed on non-magnetic billets, to increase yield and lower conditioning costs.

Take Your Inspection Problems to the House of Answers . . .

MAGNAFLUX CORPORATION

7312 W. Lawrence Avenue • Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

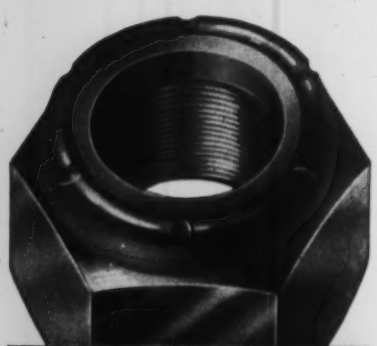
. . or Released in an Instant

Faster assembly . . . no more failures of fasteners. GREER STOP NUTS hold firm against jolts, shocks, shimmy, wobbles . . . any vibration, any kind.

Bolt threads are gripped tightly . . . these famous nuts *never* work loose. Yet an ordinary hand wrench gives instant release. The tough, built-in GREERCOID collar does it . . . and seals against fluid leakage, too!

Study *your* fastener problem. Over 3000 types and sizes. Consult GREER. Proved on thousands of products. Meets gov't and military specifications.

Write
GREER STOP NUT CO.
2620 Flournoy Chicago 12, Ill.



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WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF
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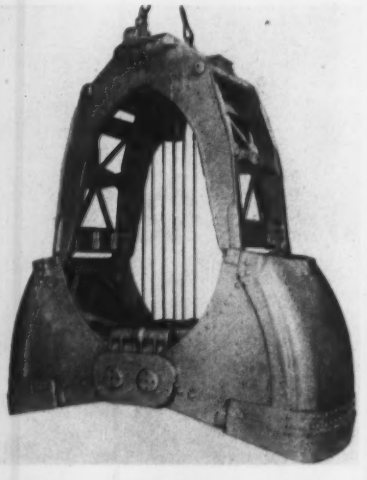
NEW PRODUCTS and equipment

180°F and higher to remove rust. It does not cause hydrogen embrittlement, will not attack the base metal and is nontoxic. After removing rust, it tends to prevent further rusting or oxidation of the base metal. *Write*: Mitchell-Bradford Chemical Co., Wampus Lane, Milford, Conn. *Phone*: Trinity 8-0671

Grab Buckets

The link-type hinge alignment device used on these buckets will not jam or break. The device was developed for buckets which handle slag, ore and other hard materials. It's not affected by exposure to the high heats involved in handling hot slag.



The interaction of a linkage of steel plates operates the unit. *Write*: Mead-Morrison Division, McKiernan-Terry Corp., Harrison, N. J. *Phone*: Humbolt 3-4361

Coating

Ucilon 1400 is a vinyl maintenance coating which does not require meticulous surface preparation.

It eliminates strong odors and resists acids, alkalies, water and other causes of early paint failure. It is self-priming and brushes out with no sagging or dripping.

Six colors are available. *Write*: Department 1400, Metal & Thermit Corp., Rahway, N. J. *Phone*: Lexington 2-6300

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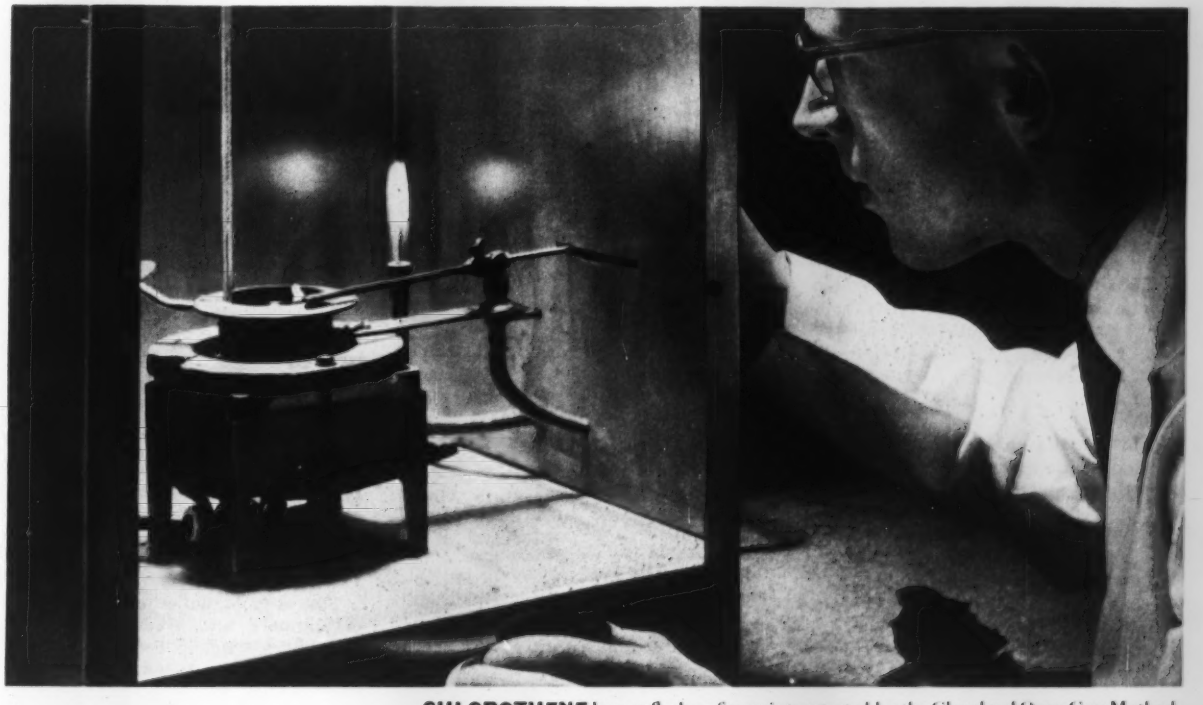
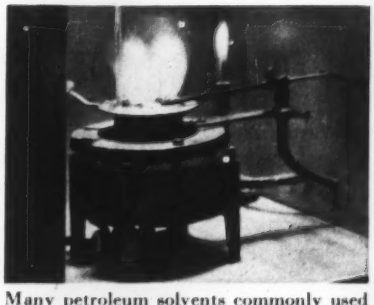


CHLOROTHENE has no flash or fire point as tested by the Cleveland Open Cup Method.



Many petroleum solvents commonly used for cold cleaning have *low* fire and flash points, and present a hazard in plants.

Hold flash and fire dangers to new lows with safer, stable CHLOROTHENE

Both all-around-the-shop and highly specialized cold solvent needs can be met more *safely! How?* By using versatile CHLOROTHENE*, the most efficient, fastest-working cold degreasing solvent you'll find in a month of Sundays. *Why?* Take another look at the pictures on this page; CHLOROTHENE has *no* flash or fire point.

What is it? CHLOROTHENE is Dow Inhibited 1, 1, 1-Trichloroethane. *Who* can use it? Any shop that cleans by spray, dip, wipe or bucket methods. Because CHLOROTHENE has low corrosive effects, it can be used with any common metal.

When can your Purchasing Department get this proved safety solvent? Right now! *Where?* Why, from your regular Dow distributor. He's no doubt already supplying you with such other stabilized, special-use solvents as DOW TRICHLOROETHYLENE, PERCHLOROETHYLENE and METHYLENE CHLORIDE. For more detailed information on any or all of these superior solvents, please return coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan. *Trademark

THE DOW CHEMICAL COMPANY, Dept S-9478, Midland, Michigan

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☐ Who is my local Dow distributor for these solvents?

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COMPANY _____ ADDRESS _____

CITY _____ ZONE _____ STATE _____

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NEW literature

Write directly to the company for a copy

Swivel Joints

Bulletin 269-A, 12 pages, describes compact joints which have the flexibility needed for pneumatic and hydraulic fluid service in aircraft. Department J40, Barco Mfg. Co., 500 N. Hough St., Barrington, Ill.

Speed Measurement

Indicators and recorders for rotational or linear speeds and the tachometer generators used with them are covered in bulletin ND46-27 (100), 2 pages. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Pallet Boxes

Specifications of wirebound pallet boxes are given in this 8-page bulletin. General Box Co., 1825 Miner St., Des Plaines, Ill.

Induction Heating

This 8-page bulletin contains data on low and high frequency equipment. Magnethermic Corp., Youngstown, O.

V-Belt Drives

This 66-page engineering manual devotes sections to V-drive selection, drive design and general information. Publications Division, Maurey Mfg. Corp., 2915 S. Wabash Ave., Chicago 16, Ill.

Reciprocating Pumps

Bulletin 100, 4 pages, describes direct flow pumps of 25 to 2400 hp. Aldrich Pump Co., 30 Pine St., Allentown, Pa.

Steel Unions

Bulletin U-1-56, 8 pages, presents dimensional and engineering data on a line of forged steel unions for high pressures. W-S Fittings Division, H. K. Porter Company Inc., P. O. Box 95, Roselle, N. J.

Tool Grinding

Tool and die steels are listed in this bulletin according to their resistance to abrasion. Bay State Abrasive Products Co., Westboro, Mass.

Casting Alloys

This wall chart lists 37 brass, bronze and nickel silver alloys. Henning Bros. & Smith Inc., 91-127 Scott Ave., Brooklyn 37, N. Y.

Stud Welding

This 36-page booklet gives specifications on welding studs, pins, pads and insulation fasteners. Stud Welding Division, KSM Products Inc., Merchantville 8, N. J.

Metal Laminates

Engineering information on combinations of two or three metals which are metallurgically bonded is presented in an 8-page bulletin. Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Motor Starters

This 16-page bulletin covers circuit breakers, magnetic motor starters, control stations, control panels and switchgear. Nelson Electric Mfg. Co., 217 N. Detroit Ave., Tulsa, Okla.

Drill Press

This 4-page bulletin, AD-1011, lists 24 models of a 20-in. drill press. Delta Power Tool Division, Rockwell Mfg. Co., 465 Lexington Ave., Pittsburgh 8, Pa.

Taps

This 6-page bulletin covers a line of standard and special taps, drills and gages. Beloit Tool Corp., 12000 Milwaukee Rd., Beloit, Wis.

Oxide Cutting Tools

This chart gives recommended speeds and feeds for turning various metals with oxide tools. Diamonite Products Division, U.S. Ceramic Tile Co., Canton 2, O.

Beryllium Copper Strip

Heat treating recommendations for producing beryllium copper strip of maximum strength and hardness are given in bulletin 8, 4 pages. Penn Precision Products Inc., 501 Cresent Ave., Reading, Pa.

Enclosed Switches

Bulletin 77, 24 pages, describes 12 types of precision switches for aircraft. Micro Switch Division, Minneapolis - Honeywell Regulator Co., Freeport, Ill.

Thickness Control

This 12-page bulletin describes systems which control strip thickness. Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, O.

Relays and Switches

This 11-page bulletin gives specifications, sizes and capacities of 40 switches and relays. Jaidinger Mfg. Co. Inc., 1921 W. Hubbard St., Chicago 22, Ill.

Fluid Drive

Bulletin 9119, 16 pages, covers fluid drives for ½ to 25-hp applications. American Blower Corp., Detroit 32, Mich.

Welding Alloys

This chart, TIS 2616, lists 150 low temperature alloys for torch and arc welding. Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y.

Brushes

Catalog 210-C, 100 pages, describes brushes used in industry, including power types. A 16-page bulletin covers the machines used for brush finishing. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

Bearings

Wide inner ring ball bearings and their load ratings are described in this 6-page bulletin. Fafnir Bearing Co., 37 Booth St., New Britain, Conn.

Packaging

This 36-page booklet contains 130 photos of strapping applications and information on the items needed in packaging. Gerrard Steel Strapping Division, 2915 W. 47th St., Chicago 32, Ill.

Casters

Selection data for over 40 models of casters are given in bulletin 412-A, 4 pages. Department 412, Gleason Corp., 250 N. 12th St., Milwaukee 3, Wis.

Metal Coatings

This 4-page bulletin describes heat-proof protective coatings which control carburization and decarburization and protect against acids, alkalis, salt spray and severe weather. Markal Co., 3052 W. Carroll Ave., Chicago 12, Ill.

Cluster Fittings

This 44-page manual on aircraft piping contains information on the planning, selection and installation of systems. Aviation Division, Weatherhead Co., 300 E. 131st St., Cleveland, O.

Thermocouples

This 6-page bulletin describes miniature shielded thermocouples for temperature measurement of gases and vapor mixes. Thermo Electric Co. Inc., Saddle Brook, N. J.

Motors

Bulletin GEA-6134A, 12 pages describes shaded-pole motors for fans and blowers in ratings from 1.5 watts

FOR CUSTOMIZED CONVEYORS WITH MAY-FRAN STANDARDIZATION

Developed to provide the ultimate of versatility, the May-Fran program of STANDARDIZATION permits users to create and construct their own conveyors to meet individual needs.

It literally provides a type of "super market" shopping for the straight, curved, inclined, take-up and discharge end sections required to meet the specifications of YOUR job requirements. Sections can be furnished to meet belt width as well as load bearing and volume capacities. Conveyors can be changed relative to length or width with only a minimum of downtime.

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MAY-FRAN ENGINEERING, INC.
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NEW ELECTRONIC CERAMICS FIRED IN A HEVI DUTY KILN

Conveyor Furnace with a 5" wide, 66" long muffle, through which a 4" wide belt travels. Rated at 18.5 KW

With a versatile Hevi Duty Electric Kiln, a manufacturer of electronic ceramics reduced rejects to a negligible amount. The firing of Titanate parts, cement coatings, printed circuits and ceramic capacitors and resistors is easily accomplished because the Hevi Duty Kiln offers these advantages:

★ **UNIFORM TEMPERATURE** Long life heating units are placed on all sides of the work chamber assuring rapid heating and even heat distribution.

★ **ZONE TEMPERATURE CONTROL** provides accurate temperatures for critical firings. A preheat and cooling chamber prevents thermal shock.

★ **ATMOSPHERE CONTROL** An alloy muffled heating chamber permits the use of reducing or special atmospheres. Curtain burners at entrance and exit prevent contaminating atmospheres from entering the chamber.

★ **VARIABLE SPEED DRIVE** The drive mechanism which is within easy reach of the operator, regulates conveyor speed for required time cycles.

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SPECIAL HEVI DUTY ELECTRIC KILNS can be engineered to coordinate with production systems. Send us your specifications.

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Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

NEW LITERATURE

to ¼-hp. Bulletin GEA-5980, 12 pages, shows construction features of 1 to 5-hp, dripproof, enclosed motors. General Electric Co., Schenectady 5, N. Y.

Phosphor-Bronze

Data on physical characteristics, processing and uses of high-tolerance phosphor - bronze in thicknesses as low as 0.0005 in. are given in a 4-page bulletin. Publications Editor, American Silver Co., 36-07 Prince St., Flushing 54, N. Y.

Brazing Alloys

This 4-page bulletin 22 lists specifications, selection factors and recommended uses of four nickel alloys which are for the brazing of stainless steel and other heat-resistant alloys. Handy & Harman, 82 Fulton St., New York 38, N. Y.

Welding Positioner

Bulletin R-1700-S18 P, 2 pages, describes a powered positioner for automatic and manual welding. Head and tailstocks for welding and assembly are covered in bulletin R-1700-S19 P, 2 pages. Positioning Equipment Division, Worthington Corp., Plainfield, N. J.

Gray Iron Castings

This 80-page buyers' directory lists foundries geographically and by the type casting they produce. Gray Iron Founders' Society Inc., 930 National City-East Sixth Bldg., Cleveland 14, O.

Plating Wastes

This 4-page bulletin describes precipitation and filtration methods of plating waste disposal. Filtration Engineers Inc., 155 Oraton St., Newark, N. J.

Perforated Metals

Bulletin 45, 6 pages, shows uses and designs of ferrous and nonferrous perforated sheets. Diamond Mfg. Co., Wyoming (Wilkes-Barre area), Pa.

Synchronous Motor

Bulletin 51B8440A, 4 pages, describes an induction motor that provides constant speeds up to 10,000 rpm. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Graphite

Properties of a carbon-graphite engineering material are covered in bulletin 20. U. S. Graphite Co., Saginaw, Mich.

Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ... and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

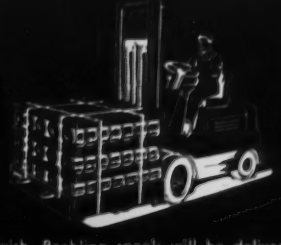
Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned ... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF&I

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK



If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork trucks.

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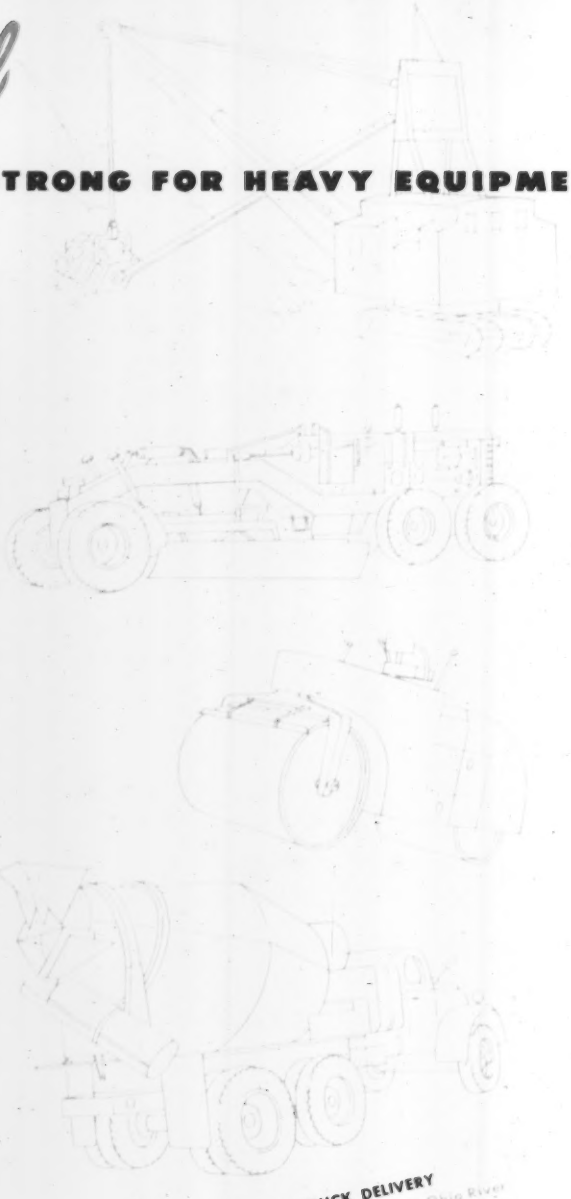
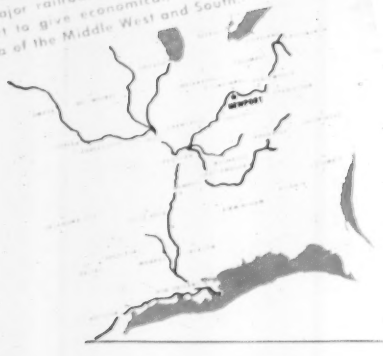
STURDY AND STRONG FOR HEAVY EQUIPMENT

Acme-Newport produces flat-rolled steel required to build today's jolting monsters. Concrete mixers, mining equipment, road rollers, power shovels, tractors, bulldozers, are but a few. Exacting laboratory control and seventy years of quality steelmaking here combine with modern furnaces, rolling mills and other facilities to meet the most exacting individual specifications. Situated in the heart of the nation's greatest industrial development, Acme-Newport also provides faster, more economical delivery throughout this vast area. Before you buy again, consult Acme-Newport about your needs.



ECONOMICAL WATERAIL-TRUCK DELIVERY

This Company is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Acme-Newport to give economical, dependable delivery to the entire area of the Middle West and South.



Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

Market Outlook

PRESSURE for finished steel shipments is expected to mount as the squeeze on certain products, notably plates, intensifies under the weight of increasing demand on government account—principally for oil tankers.

Producers and consumers are apprehensive of possible government allocation action leading to a reshaping of the current pattern of distribution.

TIGHTER SUPPLY FEARED—The channeling of larger plate tonnage under government directives, would tighten steel supplies all along the line, it is believed. Any increase in the plate load on the continuous mills would be at the expense of sheets—chiefly cold rolled, which are now in easy supply.

During World War II, 32 per cent of all the finished steel for direct war purposes came from continuous mills. This included 49 per cent of all the plates produced.

EXPECT STRONG DEMAND—Regardless of what happens next year, producers expect plate, shape and tin plate facilities to be occupied to capacity indefinitely. No balance in plates and structurals is thought possible because of the international crisis.

In bars, sheets, wire and other light items, easier market conditions may be experienced by midyear if the international situation does not get worse. Some inventory of these items is believed to be building up.

MORE AUTO BUYING—The automobile builders are ordering a little more spiritedly. But demand continues to be disappointing. The auto picture probably will not be clarified to any marked extent until we get well into the first quarter of 1957.

Specialty makers note a pickup in sales on auto account. Although auto builders are not seeking much more tonnage this month and next than their quotas provide, it may be a different story come February and March.

SHIPMENTS HEAVY—Despite the heavy production loss caused by the strike, finished steel shipments for 1956 will fall only slightly below the total for 1955—84 million net tons, against 84,417,414.

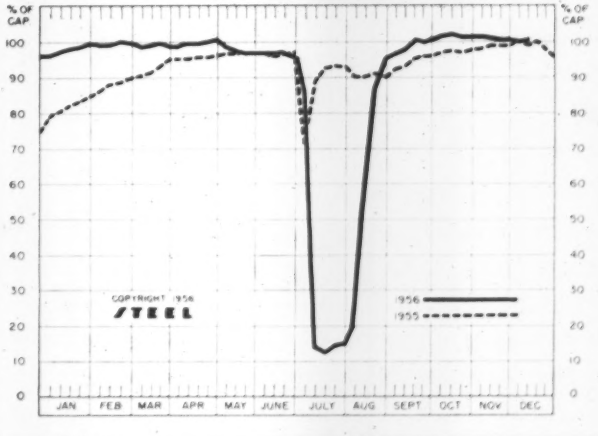
The explanation for this surprising showing is found in the higher yield from ingots. The yield this year is estimated at 73.04 per cent, versus 72.39 in 1955, 71.51 in 1954 and 71.81 in 1953.

PRODUCTION—The national ingot rate last week went up ½-point to 100.5 per cent. Except for a slight dip over the Christmas holidays, high level operations are expected to continue.

Lake shippers hope to bring ore to the lower lakes until Jan. 1 in an effort to make up for strike losses. Shipments to Dec. 3 totaled 76,362,080 tons, against 84,079,277 tons to that date in 1955. Shipments this year include 3,478,666 tons of taconite pellets.

PRICES HOLDING—STEEL's finished steel price composite is unchanged at $137.66. Advances are believed to be in store for early next year under the pressure of rising costs. Scrap continues to rise, with the index hitting a record $66.17. For the first time since early 1948, scrap is selling above basic pig iron, on which the composite stands at $62.18.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 9	Change	Same Week 1955	Same Week 1954
Pittsburgh	98	+ 1.5*	101.5	78
Chicago	101	+ 0.5	99	90.5
Mid-Atlantic	101	0	99	74
Youngstown	104	+ 3	100	86
Wheeling	102	0	100	96
Cleveland	105.5	— 1*	98.5	96
Buffalo	107.5	0	105	100
Birmingham	94	— 0.5	94.5	65.5
New England	76	— 4	89	67
Cincinnati	92.5	— 3	91.5	68
St. Louis	104.5	+ 2	103.5	80
Detroit	99.5	— 2.5	99	74
Western	103	— 2	103	83
National Rate	100.5	+ 0.5	99	81.5

INGOT PRODUCTION‡

	Week Ended Dec. 9	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.9†	154.9	153.3	150.4
NET TONS (In thousands)	2,473†	2,489	2,463	2,416

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 91 Technical Outlook—p. 141

Hundreds of POLLOCK *Cinder Cars* IN SERVICE

Daily operating in well-known steel plants throughout the world, Pollock welded Cinder Cars efficiently handle hot slag and cinder with a minimum of maintenance. With unbelievable service records, Pollock Cinder Cars resist extraordinary stresses from buffing, and from bumping the pot to dislodge skulls. Select air, steam or electric drives—all give highly efficient dumping performance. Cars can be equipped with hand brakes or air brakes. Couplers, trucks, brakes, etc., are A.A.R. standard equipment. Single or double pot. Pollock Cinder Cars are tailored to your own plant's needs. Phone or write today for complete information.

There are more Pollock Cinder Cars and Hot Metal Cars in service than any other make.

THE WILLIAM B. POLLOCK CO.

YOUNGSTOWN, OHIO

STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

Shipments—Steel and H-Bearing Piling

	Tons
*1957	465,000
*1956	445,150
1955	391,348
1954	387,654
1953	343,327
1952	235,245
1951	399,125
1950	342,247

*Estimated by STEEL.

Bethlehem Steel Co.

Piling Business Is Brisk

Product competes with structural steel to get on rolling schedules. Deliveries range from 7 to 14 months. Some users are turning to tubing as substitute

STEEL piling shipments are expected to hit 445,150 tons this year, a new peak. They may top 465,000 tons next year.

This activity is remarkable because all tonnage comes from structural mills. Structural steel is one of the tightest and heaviest backlogged of rolled products.

It takes 12 to 14 months to get deliveries on sheet piling, seven to nine months for H-piling.

Critical—Piling is the most critical material for heavy steel construction projects. For many, it is the first steel product required. (Examples include bridge piers, abutments, cofferdams and bearing foundations.)

Annual capacity is rated at 249,400 tons, but this is a nominal figure; only once in ten years (1952) have shipments been below this mark (see table). In practice, capacity is determined by how much steel and rolling space are available in competition with structurals.

Only three firms make piling: Bethlehem Steel Co., U.S. Steel Corp. and Inland Steel Co.

Cautious—Since shop fabrication is not involved, there is a growing trend among state highway departments, corps of engineers and other public agencies to buy piling direct for shipment to the job site before general contracts are placed. In most cases, better delivery results. Some large inquiries are out for shipment starting in April and May. Tonnage is specified for monthly delivery over a period of three to four months.

Situation — Availability stacks up like this: In effect, H-piles are plain structural steel—spot rollings are frequently easier to get than sheet piling. Extended deliveries and limited tonnage of bearing piling are bolstering inquiry for steel pipe, but tubular products are also tight.

Other Sources — About 10 per cent of the sheet piling produced goes to distributors. Their allocations are too low to meet demands.

Distributors are reluctant to sell outright because replacements are uncertain. They prefer to rent piling. Sheet piling is left in place on many jobs, but some of it is reclaimed.

More foreign piling is being offered, but the price advantage is slight, and, in the case of sheet piling, imported material cannot be used with domestic because of differences in shape, web and width.

Prospects—Backlogs are heavier than they were, despite shipments of around 45,000 tons per month. Demand is expected to hold through 1957.

Look for heavy construction to maintain its pace. (bridgework may be heavier). H-piling should show gains, and demand for sheet piling should be at least as strong as it is this year.

Export inquiry for sheet piling has been substantial, but brisk domestic consumption has put a damper on exports.

Steel Bars . . .

Bar Prices, Page 215

Hot-rolled carbon bar business is brisk. Most producers have all the tonnage they can handle through January, and, where they

have opened books for shipment beyond that month, they find specifications coming through in encouraging volume.

Demand is particularly strong for large rounds, both hot rolled and cold finished. One eastern converter is eight to ten weeks behind on shipment promises—due in part to production difficulties which will be remedied shortly.

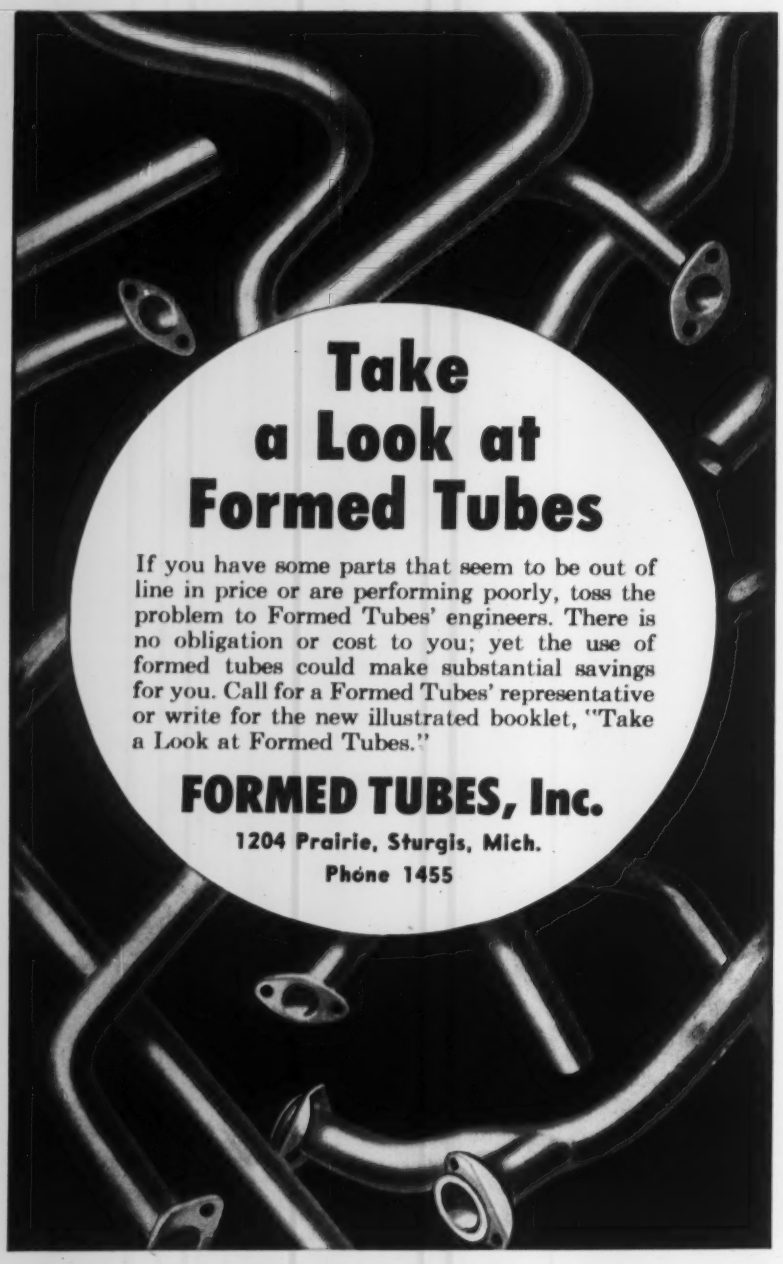
Generally, mills expect to book sufficient tonnage to keep them fully engaged through the first quarter.

Wire . . .

Wire Prices, Pages 217 & 218

There's not much zip in demand for wire products. This is the off-season for merchant items, and not much improvement in demand is anticipated before February. Manufacturers wire isn't moving as well as mills had hoped. Wire rod business is described as good, and there is a fairly active demand from redrawers and the welding rod trade for stainless steel wire.

Most carbon wire products are moving slowly in New England, including heading wire, manufacturers grades and spring stock. Since November, volume has been sagging, and users are slow to order beyond January.


Take
a Look at
Formed Tubes
If you have some parts that seem to be out of line in price or are performing poorly, toss the problem to Formed Tubes' engineers. There is no obligation or cost to you; yet the use of formed tubes could make substantial savings for you. Call for a Formed Tubes' representative or write for the new illustrated booklet, "Take a Look at Formed Tubes."
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Phone 1455

Tool Steel . . .

Tool Steel Prices, Page 219

Tool steel producers in the Pittsburgh area expect a 10 per cent sales increase next year. They base their expectations on steady automobile production and gains in aircraft applications, roadbuilding machinery and use of extrusion equipment.

A major customer, the auto makers, should require more tool steel next year. The government's roadbuilding program also is expected to boost demand.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 216 & 217

Despite heavy demand for hot-rolled sheets and the lack of special pressure for cold rolled, producers are adhering to their original broad pattern of distribution of these grades for the first quarter. They are not adding to their hot sheet allocations at the expense of cold rolled. In general, they are confident that they will be able to dispose of all cold-rolled tonnage.

In the current quarter, auto builders haven't taken as many cold-rolled sheets as had been expected. Various other consumers have not taken full allotments. In general, mills have been able to find buyers elsewhere, and they anticipate less difficulty in the coming quarter.

Some mills have offered customers extra tonnages of cold-rolled for December and January delivery. But expectations are that there will be no extra allotments in late first quarter, especially should the government increase the plate load on the continuous mills. A rejuggling of the allocation program to meet rising requirements for the maritime program and defense could do it.

The mills look for galvanized sheets to start moving more actively after the turn of the year, possibly by February. They see more business also in such specialties as enameling stock and electrical

sheets. Some makers of low silicon sheets can give late January delivery, but, admittedly, not much tonnage can be had. In the higher silicon sheets, the mills have nothing prior to March.

Stainless Steel . . .

Stainless Steel Prices, Page 219

Stainless steel bars are moving well on specifications from builders of machine tools, food processing machinery and manufacturers of screw machine products. Textile machinery specifications are lagging.

Hot alloy bar inquiry is somewhat better, but deliveries continue easy. One large producer was still offering January rolling space last week.

The newly organized Pencoyd Steel & Forge Corp., Philadelphia, has purchased the Fairmount Steel Corp., that city. Facilities include electric arc furnaces, hydraulic forging presses and machining and heat treating equipment.

Plates . . .

Plate Prices, Page 215

Producers and consumers of plates are slightly apprehensive about the government's allocation policy for steel.

The expediting of increasing maritime and defense requirements could result in a tightening up of government supply controls which would reshape the pattern of overall steel distribution—especially if directives are issued to continuous sheet mills which increase their plate loads.

During World War II, it is estimated that 32 per cent of all the finished steel provided for direct war purposes was in the form of plates, sheets and strip from the continuous sheet and strip mills. About 49 per cent of all the plates produced during the war came from continuous mills.

That explains why both producers and consumers are keeping a wary eye on Washington. The question of whether the allocation system should be broadened is expected to be taken up at a meeting of the Defense Mobilization Board.

Plate mill arrearages probably will average about a month at year's end. Producers still are being deluged with inquiry from a wide range of consumers. Talk about expansion of the government's proposed oil tanker program continues to be heard.

The mills could easily fill up their production schedules for the first half of next year and longer, if they so desired. Despite cautious booking over recent months, some mills are four to five weeks behind on deliveries. Alloy plate is reported booked up well into the second quarter. New England shipyards will take more plates, including a higher ratio of low alloy, starting in the first quarter of next year.

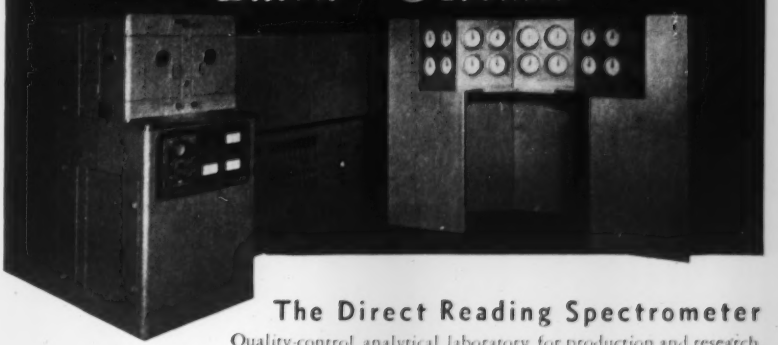
Warehouse . . .

Warehouse Prices, Page 220

Most users of sheets, wire and bars have reduced their purchases for December delivery to trim stocks for the year-end carry-over. While demand is slack for those products, distributors say the market could tighten quickly next year. If auto makers increase requirements, as expected, extra tonnages of sheets and bars being offered by mills for delivery this month will disappear.

Plates and structural shapes are becoming scarcer. Bookings by dis-

SPECTROGRAPHIC EQUIPMENT for Metal Analysis by Baird—Atomic



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tributors are limited only by the tonnages they are able to obtain from the mills. Structurals are being delivered two to four weeks behind schedule. Plate deliveries are similarly delayed. Winter is bringing no slowdown in construction needs for steel.

Tubular Goods . . .

Tubular Goods Prices, Page 219

Seasonal influences in the sale of pipe to the construction industries are slow to develop this year because of the relatively mild weather over most of the country and generally strong demand.

Some pipe fabricators have deferred their December orders to January to hold down year-end inventories, but this has had little effect on over-all sales volume.

Producers of merchant pipe are taking orders for late January and hold a firm six weeks' backlog.

Sales of seamless tubing are stronger than those of welded pipe. Users of oil country tubing have no opportunity to postpone their orders. This market area is steadily tightening under pressure for heavier exports.

Utilities are inquiring for larger tonnages of seamless pipe in New England. Mill carry-over into the first quarter will be substantial, with 6 in. and over tubing notably short.

Only on buttweld are pipe distributors balanced on inventory. Small size pressure tubing is booked well into the second quarter.

Structural Shapes . . .

Structural Shape Prices, Page 215

The Ohio Department of Mental Hygiene & Correction starts taking bids this month on about $22 million in projects. They will be financed from a $150-million bond issue for public buildings which was approved a year ago.

Although this is the season when construction usually slows down, demand for building steel continues in heavy volume. In some areas, inquiry is reported rising. Pennsylvania bridge work, for example, is noticeably more lively.

While a number of the smaller and medium-size bridge jobs are going to reinforced concrete be-

cause of the shortage of structurals, more structural tonnage is being figured than in some time because larger projects are coming out.

Structural shipments promise to continue as extended as they are now. Some of the smaller fabricating shops can give six and seven month shipment in the East, but the larger area shops are quoting up to 14 months and longer.

New England fabricators are getting plain material in slightly better volume, and shipments are more nearly on schedule. Less work is being estimated in the district. In the Midwest, the weather in many sections is tending to slow down activity. This may help fabricators accumulate steel and catch up on backlogs. But reports that many large jobs are being delayed for lack of steel are still heard.

In the Pacific Northwest, fabricators are limiting acceptances of new business to small jobs. The outlook for continued heavy demand is bright on the Pacific Coast generally. Public construction projects costing $6 billion will be undertaken in California over the next several years, says Gov. Goodwin J. Knight.

Further details on the proposed office building at 33 W. 51st St., New York, reveal it will require 36,000 tons of structural steel, not 30,000 tons as previously reported. The building will be sheathed in stainless steel (390,000 sq ft of it, exclusive of windows). This is by far the largest building requirement of stainless ever made.

Pig Iron . . .

Pig Iron Prices, Page 220

The steady advance of scrap prices has had little effect on the demand for merchant pig iron used in foundries. It has forced steel mills to use a high percentage of their iron output in their open-hearth melts.

Movement of merchant iron in the eastern section of the country is declining slightly. Not only are foundry operating rates off somewhat (some shops are operating four days a week instead of five), but consumers are letting inventories slide for year-end tax considerations. There will be an addi-

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REPORT No. 5098B-3

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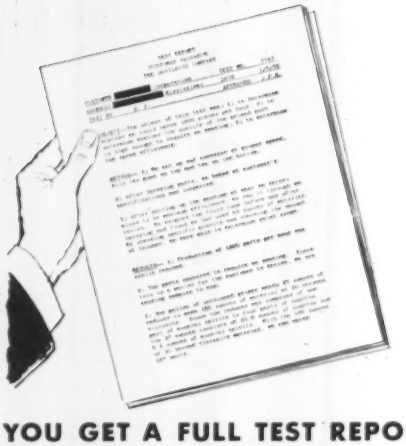

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tional decline in operations late in the month due to holiday influences. Even the steel and malleable casting shops, which have been heavily engaged, will be affected by these seasonal influences.

Foundries in the Midwest are ordering pig iron freely but are buying coke on a slower basis.

Kaiser Steel Corp. is considering a proposal to add a fourth blast furnace to its plant at Fontana, Calif.

Iron Ore . . .

Iron Ore Prices, Page 222

U.S. Engineers have been asked to keep the Soo locks open until Jan. 1 if they can. Shippers of iron ore are seeking to make up for time lost during the summer strikes. The locks were scheduled to close Dec. 12.

Lake ore shipments are about 11 million tons behind those in the 1955 season, and are about 14 million tons off the projected 1956 season movement. To Dec. 3 this year, shipments total 76,575,710 tons. This compares with 87,368,-681 tons on the same date a year ago.

Shipments in the week ended Dec 3 were 1,483,088 tons, reports the Lake Superior Iron Ore Association. In the like week a year ago only 523,502 tons were moved. During November, the lake fleet moved 8,808,168 tons, 1,391,793 tons above the movement in November, 1955.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3000 tons or more, three bridges and other construction, Noxon Rapids dam, western Montana, to Kansas City Structural Steel Co., Kansas City, for the Washington Water Power Co., Spokane, Wash.

1515 tons, H-piles, furnish and deliver, Hartford-Springfield expressway, Windsor, Windsor Locks and East Windsor, to Bethlehem Steel Co., Bethlehem, Pa.; bids direct, 500 tons per month starting Apr. 1.

780 tons, Holy Redeemer Hospital, Meadow Brook, Pa., to Robinson Steel Co., Philadelphia.

500 tons, estimated, missile buildings and facilities, Patrick AFB, Florida, to Aetna Steel Co., Jacksonville, Fla.

425 tons, senior-junior high school, Danville, Pa., to the Anthracite Bridge Co., Scranton, Pa.

250 tons, Richmond Lane elementary school, West Hartford, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn.; A. F. Peaslee Inc., Hartford, general contractor.

250 tons, tower steel for Bonneville Power Administration, Portland, Oreg., to Creamer & Dunlap, Tulsa, Okla., low at $74,606.

200 tons, repairs to the Easton-Phillipsburg bridge, awarded by the Delaware River Joint Toll Bridge Commission, Morrisville, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, Maple street bridge approach, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Henry Hagman, Spokane, general contractor.

STRUCTURAL STEEL PENDING

36,000 tons, Galbreath-Ruffin Corp., office building, 33 W. 51st St., New York; project

IRON, ORE STOCKS, OCT. 1, 1956

(Gross tons)

Stocks at	LAKE SUPERIOR ORES		OTHER ORES		Foreign	Total
Furnace Yards	U.S.	Canada	U.S.	Canada	Ores	On Hand
Eastern	5,082,952	415,388	207,179	1,294,213	1,786,339	8,786,071
Pitts-Youngstown	11,113,140	877,340	73,794	2,280,656	2,012,634	16,357,564
Cleve-Detroit	6,698,542	503,769	169,596	478,372	131,948	7,982,227
Chicago	10,365,650	(a)	(a)	.....	(a)	10,365,650
Southern	(a)	.....	1,725,922	(a)	987,389	2,713,311
Western	.....	.....	661,308	.....	.....	661,308
Total at yards	33,260,284	1,796,497	2,837,799	4,053,241	4,918,310	46,866,131
Stocks at U.S. docks						
Lake Erie	3,647,914	188,795	.....	259,172	12,169	4,108,050
Other U.S.	.....	.....	.....	(a)	(a)	(a)
Total at docks	3,647,914	188,795	.....	259,172	12,169	4,108,050
Total U.S. Stocks	36,908,198	1,985,292	2,837,799	4,312,413	4,930,479	50,974,181
At Canadian Furnace Yards	2,228,375	91,039	.....	550,793	62,163	2,932,370
Total—U.S. & Canada	39,136,573	2,076,331	2,837,799	4,863,206	4,992,642	53,906,551

IRON ORE CONSUMPTION, SEPTEMBER, 1956

(Gross tons)

In U.S.	LAKE SUPERIOR ORES		—OTHER ORES—		FOREIGN	——TOTAL FOR—— Month	Yr. To Date
DISTRICTS	U.S.	Canada	U.S.	Canada	ORES	Sept.	End-Sept.
Eastern	793,795	65,634	266,952	319,256	838,285	2,283,921	16,865,689
Pitts-Youngstown	2,468,386	130,063	131,817	352,614	589,253	3,672,134	29,258,721
Cleve-Detroit	1,102,486	70,899	51,814	73,109	58,087	1,356,395	10,981,526
Chicago	2,208,950	(a)	(a)	.....	(a)	2,208,950	17,037,205
Southern	(a)	.....	639,148	(a)	179,202	818,350	6,404,659
Western	.....	.....	599,742	.....	.....	599,742	4,938,335
IN U.S. BLAST							
FURNACES	5,662,627	237,059	1,208,865	550,077	902,238	8,560,866	67,673,540
Steel Furnaces	238,154	49	98,005	13,532	387,618	737,358	5,753,858
Agglomerating plants	672,808	29,488	382,544	178,324	331,612	1,594,776	11,911,664
Miscellaneous	28	.....	59	3,046	43,359	46,492	147,073
TOTAL U.S.	6,573,617	266,596	1,689,473	744,979	1,664,827	10,939,492	85,486,135
IN CANADA:							
Blast furnaces	280,488	31,137	.....	83,717	.....	395,342	3,410,949
Steel furnaces	9,257	.....	.....	134	13,420	22,811	208,813
Agglomerating plants	54,590	1,632	.....	16,998	1,435	74,655	709,655
Miscellaneous	.....	.....	.....	.....	.....	.....	248
TOTAL CANADIAN	344,335	32,769	.....	100,849	14,855	492,808	4,329,665
Total U.S. and Canada	6,917,952	299,365	1,689,473	845,828	1,679,682	11,432,300	89,815,800
CONSUMPTION YEAR TO DATE							
In U.S.	54,628,918	2,058,770	13,496,068	4,300,432	11,001,947		
Canada	2,839,198	482,565	.....	863,037	144,865		
Total Consumption	57,468,116	2,541,335	13,496,068	5,163,469	11,146,812		

a—Small tonnage included in other districts to avoid disclosure.
Source: Lake Superior Iron Ore Association, compiled jointly with American Iron & Steel Institute.

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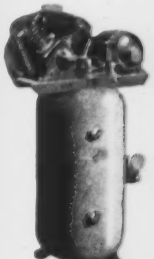

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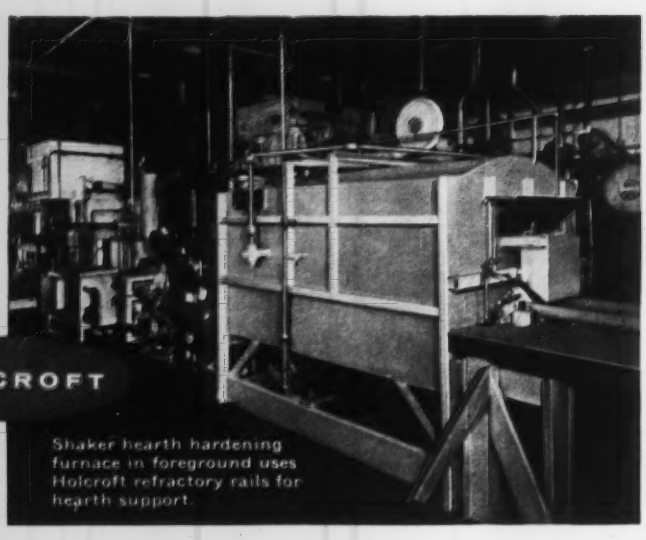

Shaker hearth hardening furnace in foreground uses Holcroft refractory rails for hearth support.

LET'S TALK ABOUT

REFRACTORY RAILS

With the current shortage of nickel, furnace manufacturers are looking for ways to replace or conserve this scarce commodity. It is interesting to note that Holcroft tackled this same problem during World War II when a nickel shortage also faced the industry.

In 1945 we designed and installed a pusher tray gas atmosphere furnace that used refractory skid rails instead of the nickel chrome alloys used at that time. Since then we have expanded their use to many other comparable applications so that now there is positive proof that properly designed installations of refractory skid rails last much longer, under similar conditions, than those made from nickel alloys. Replacements have been negligible—performance has been superior—material costs have been lower—and a marked decrease in wear on work carriers has been noted.

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CANADA Walker Metal Products Ltd. Windsor, Ontario

was previously noted as involving 30,000 tons of structural steel. Building will require 390,000 sq ft of stainless steel, exclusive of windows. Turner Construction Co. is general contractor.

4000 tons, bridge superstructure, Colorado river, Coconino county, Calif.; bids out soon; also 125 tons, reinforcing bars.

1800 tons, state bridge work, York county, Pa.; J. Robert Bazeley, Pottsville, Pa., is low on the general contract.

1068 tons, state bridge work, South Whitehall, Upper Macungie, Lower Macungie and Salisbury townships, Lehigh county, Pa., bids Dec. 20; also 349 tons of reinforcing bars.

1025 tons, cadet social center, Air Force Academy, Colorado Springs, Colo.; bids Dec. 27, schedule No. 57-312.

700 tons, pier, Navy, Newport, R. I.

600 tons, seven story, $2.1 million addition to the city light building, Seattle; plans approved; special bid call for steel late in December.

350 tons, tunnel supports, also liner plates and reinforcing, Helena Valley project, Canyon Ferry, Mont.; Guy H. Jones Construction Co., Oklahoma City, Okla., low at $2,095,041 to the Bureau of Reclamation.

341 tons, state highway bridge, Lancaster county, Pa.; bids Dec. 20.

225 tons, state highway beam bridge, Concord, N. H.

145 tons, state highway bridge, York, Me.; bids Dec. 19 at Augusta, Me.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, office building, American Mutual Liability Insurance Co., Wakefield, Mass., to Northern Steel Inc., Medford, Mass.; George A. Fuller Co., Boston, general contractor.

575 tons, approaches to the Maple street bridge, Spokane, Wash., to unstated local interest.

550 tons, hanger and three shop buildings, Grenier Field, Manchester, N. H., to Pittsburgh Bridge & Iron Co., Pittsburgh; Davison Construction Co., Manchester, general contractor.

370 tons, 12-story apartment building, E. 74th street, New York, to Capitol Steel Co., New York; Frouge Construction Co., Bridgeport, Conn., is general contractor.

265 tons, four dormitory buildings, Dartmouth College, Hanover, N.H., to Concrete Steel Co., Boston; Wexler Construction Co., Newton, Mass., general contractor.

200 tons, bars and structurals, fire station and shop buildings, Dow AFB, Bangor, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Joseph E. Bennett Co., Brookline Village, Mass., general contractor; structurals, Hussey Mfg. Co., North Berwick, Me.

REINFORCING BARS PENDING

802 tons, state bridge work, Salisbury township, Lehigh county, Pa.; bids Dec. 20; also 141 tons of structural steel.

349 tons, state bridge work, South Whitehall, Upper Macungie, Lower Macungie and Salisbury townships, Lehigh county, Pa.; bids Dec. 20; also 1068 tons of structurals.

275 tons, ammunition storage, Elelson Air Field, Alaska; bids Dec. 8.

240 tons, concrete lined channel and conduit, Revere, Malden and Everett, Mass., Metropolitan District Commission, Boston.

225 tons, ammunition storage, Elmendorf Air Field, Alaska; bids Dec. 4.

120 tons, Washington state bridges, Snohomish and Skagit counties; bids to Olympia, Wash., Dec. 18.

115 tons, also steel pipe and miscellaneous steel, Howard Prairie dam, Rouge river project, Oregon; T. A. Heintz Construction Co., Portland, Oreg., is low at $1,074,345 to the Bureau of Reclamation.

PLATES . . .

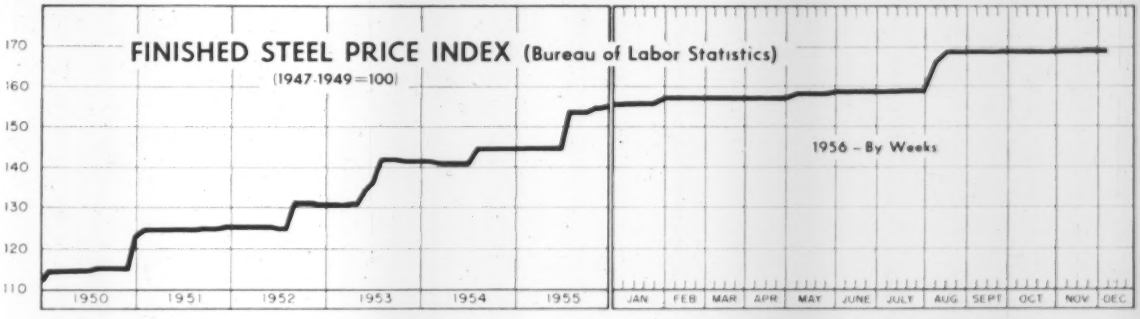
PLATES PENDING

125 tons, 250,000-gal elevated water tank, Larson AFB, Moses Lake, Wash.; bids Dec. 18, Corps of Engineers, Walla Walla, Wash.

110 tons, fuel tank, Naval air station, Oceana, Va.

110 tons, fuel tank, naval air station, Oceana, weir; also 85,000 ft of pipe; bids to Vera Irrigation District No. 15, Spokane, Wash., Dec. 13.

Price Indexes and Composites



Dec. 4 1956	Week Ago	Month Ago	Nov. Avg.	Year Ago
168.8	**168.8**	**168.8**	**168.8**	**154.6**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 4

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R., Alloy, High Speed, W. 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb	9.433
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.233
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.92	208.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.650	4.650

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.66	$137.66	$137.66	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	66.17	64.67	59.17	48.83	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, ⅞-⅝" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Dec. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld, Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	235.00†	190.00†	188.00*

†74-76% Mn, net ton. *78-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$66.50	$66.50	$58.50	$47.50	$44.00
No. 1 Heavy Melt, E. Pa.	63.00	62.50	58.00	50.00	42.50
No. 1 Heavy Melt, Chicago	69.00	65.00	61.00	49.00	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	66.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	65.00	49.50	43.00
No. 1 Heavy Melt, Buffalo	60.50	59.50	57.50	43.50	43.00
Rails, Rerolling, Chicago	89.00	89.00	87.50	73.50	52.50
No. 1 Cast, Chicago	50.50	50.50	50.50	49.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 216, to footnotes, page 218.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$70.50

INGOTS, Alloy (NT)

Detroit R7	$74.00
Houston S5	74.00
Midland,Pa. C18	74.00
Munhall,Pa. U5	74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$74.00
Bessemer,Pa. U5	74.00
Bridgeport,Conn. N19	79.00
Buffalo R2	74.00
Clairton,Pa. U5	74.00
Ensley,Ala T2	74.00
Fairfield,Ala. T2	74.00
Fontana,Calif. K1	83.50
Gary,Ind. U5	74.00
Johnstown,Pa. B2	74.00
Lackawanna,N.Y. B2	74.00
LoneStar,Tex. L6	80.00
Munhall,Pa. U5	74.00
Pittsburgh J5	74.00
S.Chicago,Ill. R2, U5	74.00
S.Duquesne,Pa. U5	74.00
Sterling,Ill. N15	74.00
Youngstown R2	74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$91.50
Bessemer,Pa. U5	91.50
Bridgeport,Conn. N19	96.50
Buffalo R2	91.50
Canton,O. R2	94.00
Clairton,Pa. U5	91.50
Conshohocken,Pa. A3	96.50
Ensley,Ala. T2	91.50
Fairfield,Ala. T2	91.50
Fontana,Calif. K1	101.00
Gary,Ind. U5	91.50
Geneva,Utah C11	91.50
Houston S5	96.50
Johnstown,Pa. B2	91.50
Lackawanna,N.Y. B2	91.50
LosAngeles B3	101.00
Midland,Pa. C18	91.50
Munhall,Pa. U5	91.50
Pittsburgh J5	91.50
Seattle B3	105.00
S.Chicago R2, U5, W14	91.50
S.Duquesne,Pa. U5	91.50
S.SanFrancisco B3	101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$107.00
Bridgeport,Conn. N19	107.00
Buffalo R2	107.00
Canton,O. R2	107.00
Conshohocken,Pa. A3	114.00
Detroit R7	107.00
Fontana,Calif. K1	128.00
Gary,Ind. U5	107.00
Houston S5	112.00
Ind.Harbor,Ind. Y1	107.00
Johnstown,Pa. B2	107.00
Lackawanna,N.Y. B2	107.00
LosAngeles B3	127.00
Massillon,O. R2	107.00
Midland,Pa. C18	107.00
Munhall,Pa. U5	107.00
S.Chicago R2,U5,W14	107.00
S.Duquesne,Pa. U5	107.00
Struthers,O. Y1	107.00
Warren,O. C17	107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19	$116.50
Buffalo R2	111.50
Canton,O. R2	114.00
Cleveland R2	111.50
Gary,Ind. U5	111.50
S.Chicago,Ill. R2,W14	111.50
S.Duquesne,Pa. U5	111.50

SKELP

Aliquippa,Pa. J5	4.725
LoneStar,Tex. L6	5.025
Munhall,Pa. U5	4.625
SparrowsPoint,Md. B2	4.625
Warren,O. R2	4.625
Youngstown R2, U5	4.625

WIRE RODS

AlabamaCity,Ala. R2	5.80
Aliquippa,Pa. J5	5.00
Alton,Ill. L1	6.00
Buffao W12	5.80
Cleveland A7	5.80
Donora,Pa. A7	5.80
Fairfield,Ala. T2	5.80
Houston S5	6.05
Indiana Harbor,Ind. Y1	5.80
Johnstown,Pa. B2	5.80
Joliet,Ill. A7	5.80
KansasCity,Mo. S5	6.05
Kokomo,Ind. C16	5.90
LosAngeles B3	6.60
Minnequa,Colo. C10	6.05
Moreasen,Pa. P7	5.80
N.Tonawanda,N.Y. B11	5.80
Pittsburg,Calif. C11	6.45
Portsmouth,O. P12	5.80
Roebling,N.J. R5	5.90
S.Chicago,Ill. R2	5.80
SparrowsPoint,Md. B2	5.90
Sterling,Ill.(1) N15	5.80
Sterling,Ill. N15	5.90
Struthers,O. Y1	5.80
Worcester,Mass. A7	6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	5.00
Aliquippa,Pa. J5	5.00
Bessemer,Ala. T2	5.00
Bethlehem,Pa. B2	5.05
Birmingham C15	5.30
Clairton,Pa. U5	5.00
Fairfield,Ala. T2	5.00
Fontana,Calif. K1	5.70
Gary,Ind. U5	5.00
Geneva,Utah C11	5.00
Houston S5	5.10
Ind.Harbor,Ind. I-2	5.00
Johnstown,Pa. B2	5.05
KansasCity,Mo. S5	5.10
Lackawanna,N.Y. B2	5.05
LosAngeles B3	5.70
Minnequa,Colo. C10	5.30
Munhall,Pa. U5	5.00
Niles,Calif. P1	5.75
Phoenixville,Pa. P4	5.85
Portland,Oreg. O4	5.80
Seattle B3	5.75
S.Chicago,Ill. U5, W14	5.00
S.SanFrancisco B3	5.65
Sterling,Ill. N15	5.00
Torrance,Calif. C11	5.70
Weirton,W.Va. W6	5.00

Wide Flange

Bethlehem,Pa. B2	5.05
Clairton,Pa. U5	5.00
Fontana,Calif. K1	5.85
IndianaHarbor,Ind. I-2	5.00
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
Phoenixville,Pa. P4	5.85
S.Chicago,Ill. U5	5.00

Alloy Std. Shapes

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.30
Munhall,Pa. U5	6.20
S.Chicago,Ill. U5	6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	7.35
Bessemer,Ala. T2	7.35
Bethlehem,Pa. B2	7.40
Clairton,Pa. U5	7.35
Fairfield,Ala. T2	7.35
Fontana,Calif. K1	8.05
Gary,Ind. U5	7.35
Geneva,Utah C11	7.35
Houston S5	7.45
Ind.Harbor,Ind. I-2, Y1	7.35
Johnstown,Pa. B2	7.40
KansasCity,Mo. S5	7.45
Lackawanna,N.Y. B2	7.40
LosAngeles B3	8.05
Munhall,Pa. U5	7.35
Seattle B3	8.10
S.Chicago,Ill. U5, W14	7.35
S.SanFrancisco B3	8.00
Struthers,O. Y1	7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	7.40
Ind.Harbor,Ind. I-2	7.35
Lackawanna,N.Y. B2	7.40
Munhall,Pa. U5	7.35
S.Chicago,Ill. U5	7.35

PILING

BEARING PILES

Bethlehem,Pa. B2	5.05
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
S.Chicago,Ill. U5	5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.90
Lackawanna,N.Y. B2	5.90
Munhall,Pa. U5	5.90
S.Chicago,Ill. U5	5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Ashland,Ky. (15) A10	4.85
Bessemer,Ala. T2	4.85
Bridgeport,Conn. N19	4.75
Clairton,Pa. U5	4.85
Claymont,Del. C22	5.35
Cleveland J5, R2	4.95
Coatesville,Pa. L7	5.25
Conshohocken,Pa. A3	4.90
Detroit M1	4.95
Ecorse,Mich. G5	4.95
Fairfield,Ala. T2	4.85
Fontana,Calif.(30) K1	5.55
Gary,Ind. U5	4.85
Geneva,Utah C11	4.85
GraniteCity,Ill. G4	5.05
Harrisburg,Pa. P4	5.80
Houston S5	4.95
Ind.Harbor,Ind. I-2, Y1	4.85
Johnstown,Pa. B2	4.85
Lackawanna,N.Y. B2	4.85
LoneStar,Tex. L6	5.20
Minnequa,Colo. C10	5.70
Munhall,Pa. U5	4.85
Newport,Ky. N9	4.85
Pittsburgh J5	4.85
Riverdale Ill. A1	4.85
Seattle B3	5.75
Sharon,Pa. S3	4.85
S.Chicago,Ill. U5, W14	4.85
SparrowsPoint,Md. B2	4.85
Steubenville,O. W10	4.85
Warren,O. R2	4.85
Weirton,W.Va. W6	4.85
Youngstown R2, U5, Y1	4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	6.20
Fontana,Calif. K1	6.70
Geneva,Utah C11	6.00
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	7.25
Bessemer,Ala. T2	7.25
Clairton,Pa. U5	7.25
Claymont,Del. C22	7.55
Cleveland J5, R2	7.25
Coatesville,Pa. L7	7.55
Conshohocken,Pa. A3	7.25
Ecorse,Mich. G5	7.35
Fairfield,Ala. T2	7.25
Fontana,Calif.(30) K1	7.95
Gary,Ind. U5	7.25
Geneva,Utah C11	7.25
Houston S5	7.35
Ind.Harbor,Ind. I-2, Y1	7.25
Johnstown,Pa. B2	7.25
Munhall,Pa. U5	7.25
Pittsburgh J5	7.25
Seattle B3	7.25
Sharon,Pa. S3	7.25
S.Chicago,Ill. U5, W14	7.25
SparrowsPoint,Md. B2	7.25
Warren,O. R2	7.25
Youngstown U5, Y1	7.25

PLATES Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.85
Coatesville,Pa. L7	6.85
Fontana,Calif.(30) K1	7.55
Gary,Ind. U5	6.85
Houston S5	6.95
Ind.Harbor,Ind. Y1	6.85
Johnstown,Pa. B2	6.85
Munhall,Pa. U5	6.85
Newport,Ky. N9	6.85
Seattle B3	7.75
Sharon,Pa. S3	6.85
S.Chicago,Ill. U5, W14	6.85
SparrowsPoint,Md. B2	6.85
Youngstown Y1	6.85

FLOOR PLATES

Cleveland J5	5.925
Conshohocken,Pa. A3	5.925
Harrisburg,Pa. P4	6.275
Ind.Harbor,Ind. I-2	5.925
Munhall,Pa. U5	5.925
S.Chicago,Ill. U5	5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10	5.10
Ashland l.c.l. (15) A10	5.60
Cleveland c.l. R2	5.60
Warren,O. c.l. R2	5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.075
Aliquippa,Pa.(9) J5	5.075
Alton,Ill. L1	5.275
Atlanta(9) A11	5.575
Bessemer,Ala.(9) T2	5.075
Birmingham(9) C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo(9) R2	5.075
Clairton,Pa. U5	5.075
Cleveland(9) R2	5.075
Ecorse,Mich.(9) G5	5.175
Emeryville,Calif. J7	5.85
Fairfield,Ala.(9) T2	5.075
Fairless,Pa.(9) U5	5.225
Fontana,Calif.(9) K1	5.775
Gary,Ind.(9) U5	5.075
Geneva,Utah(9) C11	5.157
Houston(9) S5	5.325
Ind.Harbor(9) I-2, Y1	5.075
Johnstown,Pa.(9) B2	5.075
Joliet,Ill. P22	5.575
KansasCity,Mo.(9) S5	5.325
Lackawanna(9) B2	5.075
LosAngeles(9) B3	5.775
Milton,Pa.(23) M18	5.425
Minnequa,Colo. C10	5.525
Niles,Calif. P1	5.85
N.T'wanda,N.Y.(9) R11	5.075
Pittsburg,Calif.(9) C11	5.775
Pittsburgh(9) J5	5.075
Portland,Oreg. O4	5.85
Seattle B3, N14	5.825
S.Ch'e'go(9) R2,U5,W14	5.075
S.Duquesne,Pa.(9) U5	5.075
S.SanFran.,Calif.(9) B3	5.825
Sterling,Ill.(1) N15	5.075
Sterling,Ill. N15	5.175
Struthers,O. Y1	5.075
Torrance,Calif.(9) C11	5.775
Weirton,W.Va.(9) W6	5.075
Youngstown(9) R2, U5	5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17	7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	6.125
Bridgeport,Conn. N19	6.20
Buffalo R2	6.125
Canton,O. R2	6.125
Clairton,Pa. U5	6.125
Detroit R7	6.125
Ecorse,Mich. G5	6.225
Fairless,Pa. U5	6.275
Fontana,Calif. K1	7.175
Gary,Ind. U5	6.125
Houston S5	6.375
Ind.Harbor,Ind. I-2,Y1	6.125
Johnstown,Pa. B2	6.125
KansasCity,Mo. S5	6.375
Lackawanna,N.Y. B2	6.125
LosAngeles B3	7.175
Massillon,O. R2	6.125
Midland,Pa. C18	6.125
S.Chicago R2, U5, W14	6.125
S.Duquesne,Pa. U5	6.125
Struthers,O. Y1	6.125
Warren,O. C17	6.125
Youngstown U5	6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	7.425
Bessemer,Ala. T2	7.425
Bethlehem,Pa. B2	7.425
Bridgeport,Conn. N19	7.50
Clairton,Pa. U5	7.425
Cleveland R2	7.425
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.425
Fontana,Calif. K1	8.125
Gary,Ind. U5	7.425
Houston S5	7.675
Ind.Harbor,Ind. Y1	7.425
Johnstown,Pa. B2	7.425
KansasCity,Mo. S5	7.675
Lackawanna,N.Y. B2	7.425
LosAngeles B3	8.125
Pittsburgh J5	7.425
Seattle B3	8.175
S.Chicago,Ill. U5, W14	7.425
S.DuquesnePa. U5	7.425
S.SanFrancisco B3	8.175
Struthers,O. Y1	7.425
Youngstown U5	7.425

BAR SIZE ANGLES, H.R. Carbon

Bethlehem,Pa.(9) B2	5.225
Houston S5	5.325
KansasCity,Mo. S5	5.325
Lackawanna(9) B2	5.075
Sterling,Ill. N15	5.175
Sterling,Ill.(1) N15	5.075

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5	5.075
Atlanta A11	5.575
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.85
Pittsburgh J5	5.075
Portland,Oreg. O4	5.85
SanFrancisco S7	5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.45
KansasCity,Mo. S5	6.45
Youngstown U5	6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18	9.475
BeaverFalls,Pa. M12	9.475
Chicago W18	9.475
Cleveland C20	9.475
LosAngeles S30	11.10
LosAngeles P2	11.60
Monaca,Pa. S17	9.225
Newark,N.J. W18	9.65
Warren,O. C17	9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.85
BeaverFalls,Pa. M12,R2	6.85
Bridgeport,Conn. N19	7.20
Buffalo B5	6.90
Camden,N.J. P13	7.30
Carnegie,Pa. C12	6.85
Chicago W18	6.85
Cleveland A7, C20	6.85
Detroit B5, P17	7.05
Detroit R7	6.85
Donora,Pa. A7	6.85
Elyria,O. W8	6.85
FranklinPrk,Ill. N5	6.85
Gary,Ind. U5	6.85
GreenBay,Wis. F7	6.85
Hammond,Ind. L2, M13	6.85
Hartford,Conn. R2	7.35
Harvey,Ill. B5	6.85
LosAngeles(49) S30	8.30
LosAngeles P2, R2	8.30
Mansfield,Mass. B5	7.40
Massillon,O. R2, R8	6.85
Midland,Pa. C18	6.85
Monaca,Pa. S17	6.85
Newark,N.J. W18	7.30
NewCastle,Pa.(17) B4	6.85
Pittsburgh J5	6.85
Plymouth,Mich. P5	7.10
Putnam,Conn. W18	7.40
Readville,Mass. C14	7.40
S.Chicago,Ill. W14	6.85
SpringCity,Pa. K3	7.30
Struthers,O. Y1	6.85
Waukegan,Ill. A7	6.85
Youngstown F3, Y1	6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	8.325
BeaverFalls,Pa.M12,R2	8.325
Bethlehem,Pa. B2	8.325
Bridgeport,Conn. N19	8.475
Buffalo B5	8.325
Camden,N.J. P13	8.50
Canton,O. T7	7.425
Carnegie,Pa. C12	8.325
Chicago W18	8.325
Cleveland A7, C20	8.325
Detroit B5, P17	8.525
Detroit R7	8.325
Donora,Pa. A7	8.325
Elyria,O. W8	8.325
FranklinPark,Ill. N5	8.325
Gary,Ind. R2	8.325
GreenBay,Wis. F7	8.325
Hammond,Ind. L2, M13	8.325
Hartford,Conn. R2	8.625
Harvey,Ill. B5	8.325
LosAngeles P2, S30	10.10
Mansfield,Mass. B5	8.625
Massillon,O. R2, R8	8.325
Midland,Pa. C18	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
Plymouth,Mich. P5	8.525
S.Chicago,Ill. W14	8.325
SpringCity,Pa. K3	8.50
Struthers,O. Y1	8.325
Warren,O. C17	8.325
Waukegan,Ill. A7	8.325
Worcester,Mass. A7	8.625
Youngstown F3, Y1	8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	5.075
Atlanta A11	5.575
Birmingham C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo R2	5.075
Cleveland R2	5.075
Ecorse,Mich. G5	5.425
Emeryville,Calif. J7	5.85
Fairfield,Ala. T2	5.075
Fairless,Pa. U5	5.225

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. B5 ....5.325
Lackawanna,N.Y. B2 .5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ....5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ⅛-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2; I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 .....5.15
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 .....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt)L5 .19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 .....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 .....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Dravosburg,Pa. U5 ....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ...6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	...	6.65
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg,Pa. U5 ....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg, Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft.Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvonized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.10	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	....	....	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	....	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	....	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.00	12.05	13.05
Brackenridge,Pa. A4	....	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	....	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	....	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	....	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	....	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Manafield O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	....	10.85†	11.525†	12.575† 13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	16.90	18.50	19.00	19.50	14.05**	
Butler,Pa. A10	....	18.50	19.00	19.50	....	
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind. Harbor Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Athanta A11	166
Bartonville,Ill (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (1) N15	164
Worcester,Mass. A7	170

NAILS, Stock

Chicago (7) W13	167
Cleveland (7) A9	173

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston S5	9.78
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston S5	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	10.45
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston S5	10.15
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	184••
Aliquippa,Pa. J5	184‖
Atlanta A11	190•
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	188•
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189••
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189••
Monessen,Pa. P7	191•
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184••
S.SanFrancisco C10	207••
SparrowsPoint,Md. B2	190•
Sterling,Ill(1) N15	188•

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	176••
Aliq'ppa,Pa. 9-14½ga.J5	184‖
Atlanta A11	182•
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181••
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	180•
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181••
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181••
Monessen,Pa. 9 ga. P7	185•
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176••
Sterling,Ill.(1) N15	180•

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	15.70	17.25••
Bartonville K4	16.10	18.05
Buffalo W12	16.10	—
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50••
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05•
Kan.City,Mo.S5	15.95	17.50••
Kokomo C16	15.80	17.35†
Minnequa C10	16.05	17.75••
P'lm'r,Mass.W12	16.10	17.65•
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt.	B2.16.20	18.15•
Sterling(1)	N15 16.10	18.05•
Waukegan A7	15.70	17.25†
Worcester A7	16.00	—

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala.	R2 7.95	8.35••
Aliquippa	J5	8.10 8.625‖
Atlanta	A11	8.05 8.65•
Bartonville(48)	K4 8.20	8.80
Buffalo	W12	8.10 8.50†
Cleveland	A7	7.95 —
Crawfordsville	M8	8.20 8.80
Donora,Pa.	A7	7.95 8.35†
Duluth	A7	7.95 8.35†
Fairfield	T2	7.95 8.35†
Houston(48)	S5	8.20 8.60••
Jacks'ville,Fla.	M8	8.45 9.05
Johnstown	B2(48)	7.95 8.55•
Joliet,Ill.	A7	7.95 8.35†
Kans.City(48)	S5	8.20 8.60••
Kokomo	C16	8.05 8.45†
LosAngeles	B3	8.90 9.50•
Minnequa,	C10	8.20 8.60••
Monessen	P7 (48)	8.10 8.70•
Palmer,Mass.	W12	8.40 8.80†
Pitts.,Calif.	C11	8.90 9.30†
Portsmouth,O.	P12	8.10 —
Rankin,Pa.	A7	7.95 8.35†
S.Chicago	R2	7.95 8.35••
S.SanFran.	C10	8.90 9.30••
Spar'wsPt.	B2(48)	8.05 8.65•
Sterling(1)(48)	N15	7.95 8.55•
Struth'rs,O.(48)	Y1	7.95 8.45‡
Worcester,Mass.	A7	8.25 8.65†

Based on zinc price of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

SALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo.C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
SparrowsPoint.,Md. B2	192
Sterling,Ill. N15	190
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W. Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Based discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.. 55
Longer than 6 in. .. 46.5
⅝ in. thru 1 in.:
6 in. and shorter .. 46.5
Longer than 6 in. .. 44
1⅛ in. and larger:
All lengths 44
Undersized Body (rolled thread):
½ in. and smaller:
6 in. and shorter .. 55

Carriage, Machine, Lag Bolts Hot Galvanized:
½ in. and smaller:
6 in. and shorter .. 35
Longer than 6 in. .. 23
⅝ in. thru 1 in.:
6 in. and shorter .. 20
Longer than 6 in. .. 20
1⅛ in. and larger:
All lengths 20

Lag Bolts
All diameters:
6 in. and shorter 55
Longer than 6 in. .. 47

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅝ in. and smaller	63
⅞ in. to 1 in. incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger	58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅝ in. and smaller	63
⅞ in. to 1⅛ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, All Types, Hot Galvanized:

⅝ in. and smaller..	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller ..	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger..	58

CAP AND SET SCREWS

(Based discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Crawfordsville,Ind. Cap or Fine Thread

Bright:
6 in. and shorter:
⅝ in. and smaller.. 47
⅞, 1 in. and 1 in. diam. 31
Longer than 6 in.:
⅝ in. and smaller.. 18.5
⅞, 1 in. and 1 in. diam. 5.5

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 34
⅞, 1 in. and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller. +1
⅞, 1 in. and 1 in. diam. ..... +19

Fillister Head, Coarse Thread:
Listed Sizes ..... +31

Flat Head, Coarse Head:
¼ in. and smaller by 6 in. and shorter.. +57

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer that 6 in. .. +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
½-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W. Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 0.25c; 1 15/16 to 8 in.; inclusive, 0.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.80c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+30	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+30	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.35
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.35
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.35
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.35
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	3.75	11	+7.25	11	+7.35
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.35
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.35

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.50	46.75	48.25	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	58.50	57.50	60.50	64.25	73.50	73.50
310	42.25	53.75	69.00	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	63.75	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	—Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.40	40.65

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20	4	2	12.25	....	4.170
18	4	1	4.75	....	2.385
18	4	2	9	....	2.7875
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity, Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland, Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09§	15.69	8.57	8.12	10.81
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60¹⁰	....	7.90	8.00	8.65	8.70¹⁰	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.54	9.09	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	8.29	9.49	10.31	....	8.39	8.52	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	10.50	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ³—400 to 999 lb; ⁴—1000 to 1999 lb; ⁵—2000 to 3999 lb; ¹⁰—2000 lb and over.

MicroRold®
STAINLESS
SHEET

Type 430 Bright Finish

up to 48" WIDE

BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

Washington Steel
Corporation
12-0 WOODLAND AVENUE WASHINGTON PA

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00-34.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$28.50-29.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00
South African Transvaal	
48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00
Turkish	
48% 3:1	$60.00-63.00
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.l.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	*26.00*
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	*59.00*
Powder Flakes (minus 16, plus 100 mesh)	*29.00*
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght. allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	55.10-58.40†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

Inches Diam.	Length	Per 100 lb
GRAPHITE		
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75
CARBON		
8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearney, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.40	$7.40	$7.40	$7.65
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.40	7.40	7.40	7.70
I-Beams	7.75	7.75	7.75	8.15
Plates	9.50	9.50	9.50	10.00
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.02	27.02	27.02	27.49
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	7.90	7.90	7.90	8.02
Oil Country Pipe: Mills withdrawn for remainder of the year.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.	

Weight 63,600 lbs.

PRECISION

GRAY IRON • ALLOY IRON • DUCTILE IRON

CASTINGS

CEMENT BONDED SAND METHOD

CHAMBERSBURG ENGINEERING COMPANY

"THE HAMMER BUILDERS"

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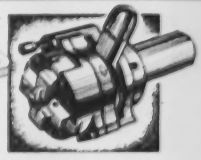

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Scrap Market Strength Sustained

High level steelmaking operations provide strong support to prices, though buying is less active. STEEL's composite on the steel grades rises to $64.83

Scrap Prices, Page 226

Philadelphia—Prime grades of open-hearth scrap have advanced to a flat $63, delivered, and appear likely to level off at that figure. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are holding at that figure, with No. 2 heavy melting and No. 2 bundles unchanged at $55-$56 and $53-$54, delivered.

Prices on most other steel grades have materialized on sales at the nominal levels noted a week ago. Only in heavy turnings has there been a downward revision to $58-$59, delivered. Rail crops advanced to $82-$83.

The cast market is featured by a $2 rise in heavy breakable to $59, delivered, and $1 increase in drop broken machinery to $59-$60.

St. Louis — Scrap prices are mounting as demand grows stiffer and supply gets scarce. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are up $2 a ton.

Pittsburgh — Several purchases have reinforced the high level of prices established recently. Cast iron grades have been moving steadily upward after No. 1 heavy melting leveled off at $67. There is some resistance to steadily increasing prices of stainless steel scrap.

Cleveland — The scrap market here and in the Valley continues to display strength but the situation is mixed. High prices are attracting tonnage, but it is moving steadily to the mills and foundries on old orders. So far, weather has not cut collections. Recent auto lists went at both higher and lower prices.

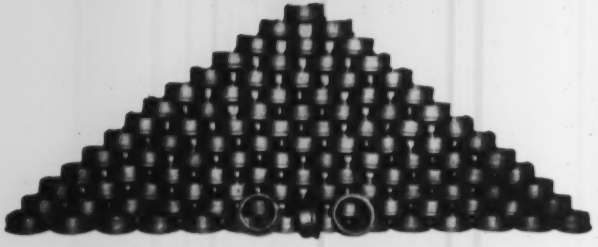
New York—Scrap brokers have advanced buying prices on No. 1 heavy melting steel and No. 1 bundles $3 a ton to $56-$57, and have increased offerings on secondary grades $1, paying $48-$49 for No. 2 heavy melting and $46-$47 for No. 2 bundles.

Prices on machine shop turnings and mixed borings and turnings have been boosted $2 to $35-$36; short shoveling turnings similarly to $41-$42; and low phos $3 to $59-$60. The cast grades and stainless steel specialties hold unchanged.

Boston — Heavy melting steel prices are stronger. Brokers are offering $2 more for No. 2 heavy melting and No. 2 bundles. Buying for export has resumed, but it is slower than it had been, with nearby ship loadings well covered. Shipments to eastern Pennsylvania are heavier. Due to the high freight, $13.50, little scrap is moving to Pittsburgh from this area.

Chicago—Strength in the scrap market continues to build up despite lack of representative purchases by steelmakers. The yardstick on price still is the one of

CASTINGS OF STAINLESS STEEL



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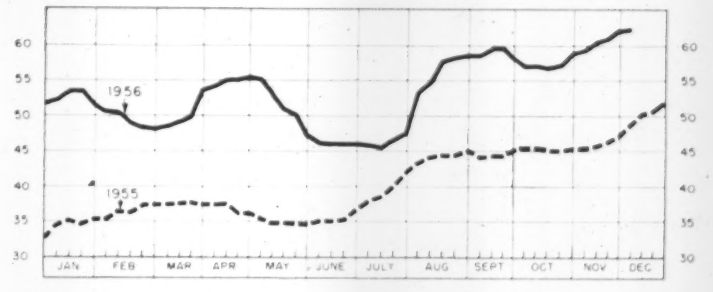
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



Dec. 5 1956	Week Ago	Month Ago	Year Ago	Nov. Avg.
$66.17	$64.67	$59.17	$48.83	$61.83

broker-dealer transactions. Brokers are seeking to complete old orders. The weather has been favorable to scrapyard operation, but the better grades of material are in short supply.

Buffalo—Scrap has advanced due to demand for out-of-district shipments. No. 1 heavy melting is quoted at $61, up $1; No. 2 heavy melting at $51 is up $2, and low phos at $65 is up $4. The turnings grades are up sharply with machine shop $6 higher at $40, short shoveling up $7 to $44, and mixed borings and turnings up $3 at $39.

Youngstown—Scrap is firm here, and further strengthening is indicated over the winter. U. S. Steel bought No. 2 heavy melting at $58, up $8 from previous dealer sales here. Sales at Massillon were made at $58, causing brokers to cover at $52 and $53. The last sale of No. 2 bundles was at $47.

The new price on No. 2 steel is more in line with the prevailing price on No. 1 heavy melting, $65-$66. The former spread of $15 was said to have been too wide.

Dealers say a great amount of scrap is moving through yards, and they fear cold weather and snow will cut into collections and slow down processing.

Cincinnati — Scrap prices are higher here. New buying for December shipment moved the key grades up $3 a ton. No. 1 heavy melting is quoted at $62-$63, brokers' buying price.

Birmingham — Scrap continues strong, but prices are holding, with consumers confining purchases to local dealers. An Alabama mill has held up shipments for the remainder of the year on recent sizable purchases.

Detroit — November auto lists closed on the high side, but local brokers maintain a bearish attitude. Prices are steady.

San Francisco—The price trend in this area is mixed. Some grades

(*Please turn to page* 231)

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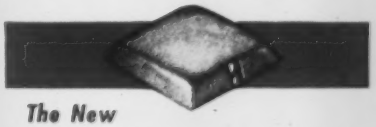

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Iron and Steel Scrap

Consumer prices, per gross tons, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 5	$66.17
Nov. 28	64.67
Nov. Avg.	61.83
Dec. 1955	50.37
Dec. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	58.00-59.00
No. 1 bundles	66.00-67.00
No. 2 bundles	53.00-54.00
No. 1 busheling	66.00-67.00
Machine shop turnings	44.00-45.00
Mixed borings, turnings	44.00-45.00
Short shovel turnings	48.00-49.00
Cast iron borings	48.00-49.00
Cut structurals, 3 ft. lengths	*73.00-74.00*
Heavy turnings	59.00-60.00
Punchings & plate scrap	*73.00-74.00*
Electric furnace bundles	*73.00-74.00*

Cast Iron Grades

No. 1 cupola	*56.00-57.00*
Heavy breakable cast	*54.00-55.00*
Unstripped motor blocks	*41.00-42.00*
No. 1 machinery cast	*63.00-64.00*

Railroad Scrap

No. 1 R.R. heavy melt	71.00-72.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	79.00-80.00
Railroad specialties	75.00-76.00

Stainless Steel Scrap

18-8 bundles & solids	*480.00-520.00*
18-8 turnings	*400.00-420.00*
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	62.00-63.00
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	59.00-60.00
Charging box cast	52.00-53.00
Heavy breakable cast	50.00-51.00
Stove plate	55.00-56.00
Unstripped motor blocks	39.00-40.00
Brake shoes	47.00-48.00
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt	68.00-69.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	71.00-72.00
Railroad specialties	77.00-78.00
Uncut tires	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt	69.00-70.00

CHICAGO

No. 1 heavy melting	*67.00-71.00*
No. 2 heavy melting	53.00-54.00
No. 1 factory bundles	*74.00-75.00*
No. 1 dealer bundles	*66.00-67.00*
No. 2 bundles	48.00-49.00
No. 1 busheling	*67.00-71.00*
Machine shop turnings	*43.00-44.00*
Mixed borings, turnings	*45.00-46.00*
Short shovel turnings	*45.00-46.00*
Cast iron borings	*45.00-46.00*
Cut structurals, 3 ft	*72.00-73.00*
Punchings & plate scrap	*73.00-74.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*73.00-74.00*
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*91.00-92.00*
Rails, 18 in. and under	*92.00-93.00*
Angles, splice bars	*82.00-84.00*
Rails, rerolling	*93.00-94.00*

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	*49.00*
No. 1 bundles	60.00
No. 2 bundles	40.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	64.00-65.00

Cast Iron Grades

No. 1 cupola	49.00
Charging box cast	43.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	54.00
Malleable	54.00

BIRMINGHAM

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	46.00-47.00
No. 2 bundles	38.00-39.00
No. 1 busheling	46.00-47.00
Cast iron borings	27.00-28.00
Short shovel turnings	37.00-38.00
Machine shop turnings	36.00-37.00
Bar crops and plate	60.00-61.00
Structurals & plate, 2 ft	59.00-60.00
Electric furnace bundles	54.00-55.00
Cut foundry steel	52.00-53.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	52.00-53.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt	61.00-62.00
Rails, 18-in and under	74.00-75.00
Rails, rerolling	80.00-81.00
Rails, random lengths	69.00-70.00
Angles, splice bars	66.00-67.00

PHILADELPHIA

No. 1 heavy melting	*63.00*
No. 2 heavy melting	55.00-56.00
No. 1 bundles	*63.00*
No. 2 bundles	53.00-54.00
No. 1 busheling	*63.00*
Electric furnace bundles	65.00-66.00
Mixed borings, turnings	45.00-46.00
Machine shop turnings	45.00-46.00
Short shovel turnings	49.00-50.00
Heavy turnings	*58.00-59.00*
Structurals & plates	68.00-69.00
Couplers, springs, wheels	72.00
Rails, crops, 2 ft & under	*82.00-83.00*

Cast Iron Grades

No. 1 cupola	52.00-54.00
Malleable	68.00
Heavy breakable cast	*59.00*
Drop broken machinery	*59.00-60.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*56.00-57.00*
No. 2 bundles	*46.00-47.00*
Machine shop turnings	*35.00-36.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*41.00-42.00*
Low phos. (structural & plate)	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	37.00-38.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 heets, clips, solids	475.00-485.00
18-8 borings, turnings	315.00-340.00
430 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*53.00-54.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	33.50-34.00
Short shovel turnings	*35.00-36.00*
No. 1 cast	*45.50-46.50*
Mixed cupola cast	*43.00-44.00*
No. 1 machinery cast	46.00-47.00

BUFFALO

No. 1 heavy melting	*60.00-61.00*
No. 2 heavy melting	*50.00-51.00*
No. 1 bundles	*60.00-61.00*
No. 2 bundles	43.00-44.00
No. 1 busheling	*60.00-61.00*
Mixed borings, turnings	*38.00-39.00*
Machine shop turnings	*39.00-40.00*
Short shovel turnings	*43.00-44.00*
Cast iron borings	34.00-35.00
Low phos.	*64.00-65.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	*70.00-71.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*62.00-63.00*
No. 2 heavy melting	*52.00-53.00*
No. 1 bundles	*62.00-63.00*
No. 2 bundles	*46.00-47.00*
No. 1 busheling	*62.00-63.00*
Machine shop turnings	*41.50-42.50*
Mixed borings, turnings	*39.50-40.50*
Short shovel turnings	*43.50-44.50*
Cast iron borings	*39.50-40.50*
Low phos. 18 in.	66.00-67.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt	64.00-65.00
Rails, 18 in. and under	*82.00-83.00*
Rails, random lengths	74.00-75.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*58.00*
No. 2 heavy melting	48.50
No. 1 bundles	*58.00*
No. 2 bundles	44.00
No. 1 busheling	*58.00*
Machine shop turnings	36.00
Short shovel turnings	38.50

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	46.50
Heavy breakable cast	46.50
Unstripped motor blocks	45.50
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	*44.50*

Railroad Scrap

No. 1 R.R. heavy melt	66.50
Rails, 18 in. and under	86.00
Rails, rerolling	90.00
Rails, random lengths	*85.00*
Angles, splice bars	72.00

SEATTLE

No. 1 heavy melting	54.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00
Machine shop turnings	*28.00-30.00*
Mixed borings, turnings	*28.00-30.00*
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	*54.00-56.00*
Heavy breakable cast	46.00
Unstripped motor blocks	48.00-50.00
Stove plate (f.o.b. plant)	40.00-42.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	54.00
No. 1 bundles	54.00
No. 2 bundles	47.00
Machine shop turnings	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	62.00

SAN FRANCISCO

No. 1 heavy melting	*55.00*
No. 2 heavy melting	52.00
No. 1 bundles	*54.00*
No. 2 bundles	*40.00*
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

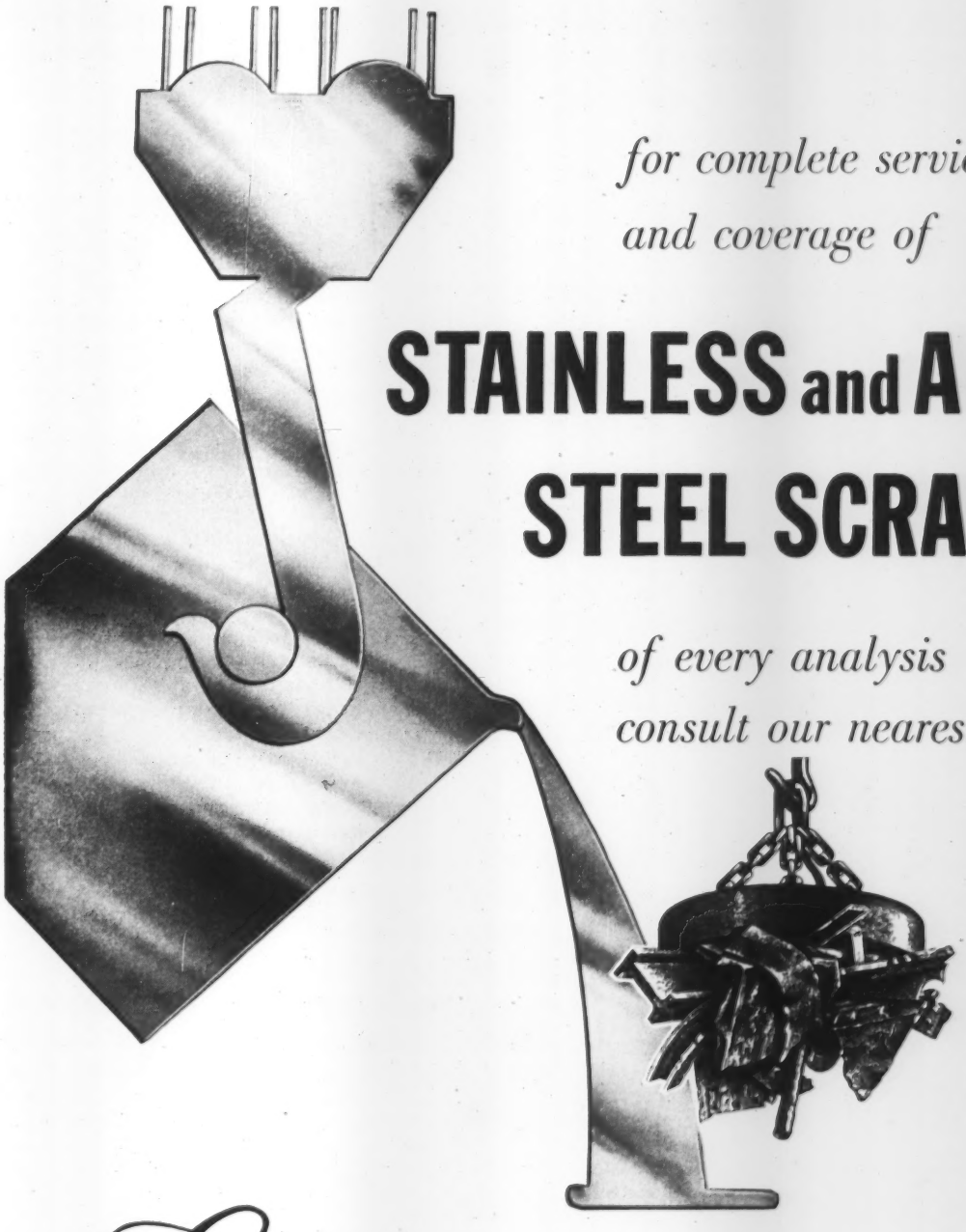
HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Busheling, new factory: Prepared	50.00
Unprepared	46.00
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



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Aluminum Inventory Mounts

Producers now have large enough stocks to step up development of existing markets. Brass mills continue to look for new business as December starts off slowly

Nonferrous Metal Prices, Pages 230 & 231

PRIMARY aluminum producers are shipping only 80 to 85 per cent of their pig and ingot production.

"While some of our people are getting jittery, it is actually a healthy situation. Our sales force is going to have to sell hard again," says one producer.

Observations — Most aluminum people feel that the 15 to 20 per cent oversupply is temporary. During the coming year, demand will continue to be strong. Increased facilities will tend to keep supply ahead of applications, but market research men warn that by 1960 aluminum could be in tight supply again.

Reports one executive: "People think we have a drawer full of new products to announce. While we do have some, our basic aim is to further develop markets which we have just scratched rather than look for a spectacular new market."

There will be no shortage of aluminum during the coming months, but its use in 1957 should set another record.

Nickel Rumor Grows

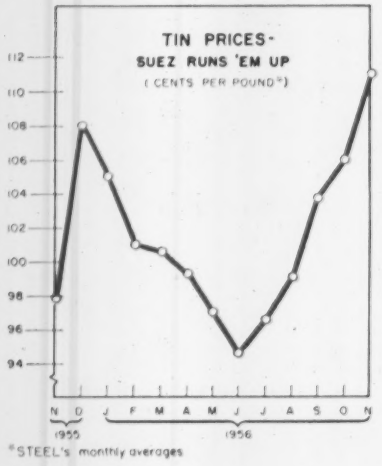
As Middle East tension subsides, a rumor persists that the Office of Defense Mobilization would like to drop its role as a supervisor of the nickel industry. It has been a headache (ODM has been flooded with complaints), and industry observers contend that more equitable distribution patterns could be set up if the government were not looking over producers' shoulders.

A plater reports that a recent influx of foreign nickel salts has eased the panic in the plating industry for this product. He asks: "If nickel salts market can be eased this much, what will happen if the primary producers are allowed to distribute (on a need basis) the nickel which is going to be deferred from stockpile during the first quarter of 1957?"

Outlook: If the international situation worsens, the ODM will tighten its supervision of nickel. If tensions subside, the ODM may drop a hot potato.

Tin Market Eases

Spot tin prices dropped to about $1.10 a pound last week. The advent of better diplomatic relations among the Big Three caused the slight decline. Tin plate mills continue to buy a carload at a time, covering immediate needs.



*STEEL's monthly averages

Lead, Zinc Sales Steady

Lead and zinc sales are running smoothly. Across-the-board strengh is still being registered by lead. Battery makers are the only soft spot. Because competition is at a new peak, most battery manufacturers are keeping inventories as low as possible. Diecasters are buoying the zinc market. Galvanizers are taking tonnages.

Copper Market Dull

While the copper market is depressed, primary producers should still rack up their second best year in terms of shipments, sales and profits. Records were set in all three categories last year. Strength of the wire and cable market has been an offsetting factor.

Brass mill sales are still floundering. The feeling is growing that users of brass mill products must have most of their inventories worked off. Motordom, although going full throttle, is still a reluctant purchaser. Appliance makers continue to order slowly.

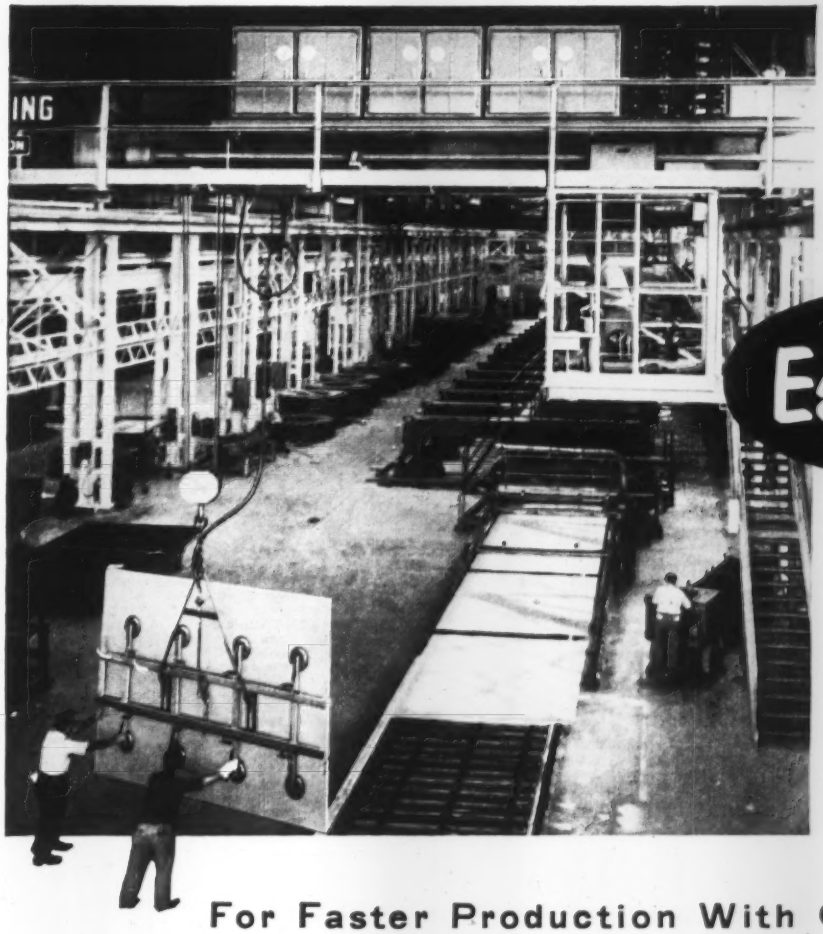
Titanium Price Drops

Titanium Metals Corp. of America has reduced prices on titanium mill products 6 to 8 per cent. Rundown: Sheet prices are down $1 a pound; strip about $1.10 a pound; bars and billets, 55 to 75 cents a pound. The reductions, attributed to growing volume and technological advances, will save customers some $3 million on contracts already signed.

NONFERROUS PRICE RECORD

	Price Dec. 5	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec., 1955 Avg.
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	35.50-36.00	Nov. 28, 1956	36.00	35.956	38.365	46.053
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.358
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	64.500	64.500	64.500
Tin	109.125	Dec. 4, 1956	109.75	111.049	105.981	107.980
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



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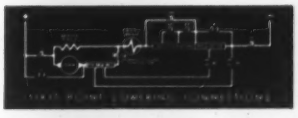

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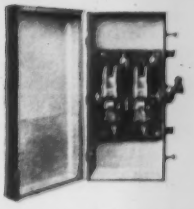

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.60, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 35.50-36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$107 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 109.125; prompt 108.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.00; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.355; l.c.l., 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*28-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

STEEL REGULAR 5⅛ on 6 Rassau (7)

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45-90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.00-14.50; old sheets, 11.00-11.50; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	58.13b	55.36c	....	58.32	32.000	32.000	31.250
Yellow Brass	50.19	40.17d	50.73	53.10	24.625	24.375	22.625
Low Brass, 80%	53.40	53.34	53.94	56.21	27.375	27.125	26.625
Red Brass, 85%	54.54	54.48	55.08	57.35	28.500	28.250	27.750
Com. Bronze, 90%	56.23	56.17	56.77	58.79	29.500	29.250	28.750
Manganese Bronze	57.88	51.98	62.22	....	23.000	22.750	22.250
Muntz Metal	52.19	48.00	....	....	23.125	22.875	22.375
Naval Brass	54.14	48.45	61.20	57.55	23.000	22.750	22.250
Silicon Bronze	62.44	61.63	62.48	64.61	31.250	31.000	30.250
Nickel Silver, 10%	65.91	68.24g	68.24	....	30.125	29.875	15.063
Phos. Bronze, A, 5%	77.25	77.75	77.75	77.93	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 11.00-11.50; industrial castings, 11.00-11.50.

Copper and Brass: No. 1 heavy copper and wire, 27.50-28.00; No. 2 heavy copper and wire, 26.00-26.50; light copper, 23.50-24.00; No. 1 composition red brass, 24.50-25.00; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 13.50-14.00; new brass clippings, 20.50-21.00; light brass, 14.50-15.00; heavy yellow brass, 16.00-16.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.50-19.00; brass pipe, 19.50-20.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50.

Monel: Clippings, 75.00-90.00; old sheets, 75.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.00-19.00; 3003 clippings, 18.00-19.00; 6151 clippings, 18.00-19.00; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings, 17.00-17.50; old sheets, 15.50-16.00; old cast, 15.50-16.00; clean old cable (free of steel), 18.00; borings and turnings, 15.75-16.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper, 26.25; refinery brass (60% copper) per dry copper content, 27.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper, 26.25; No. 1 composition borings, 27.00; No. 1 composition solids, 27.50; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 21.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.29; oval, 53.42, 5000-10,000 lb; electrodeposited, 45.78; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 128.50; 200-499 lb, 127.00; 500-999 lb, 126.50; 1000 lb or more, 126.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 76.20; 100-600 lb, 67.40; 700-1900 lb, 64.90; 2000-9900 lb, 63.20; 10,000 lb or more, 62.00.

Stannous Chloride (anhydrous): Less than 25 lb, 174.40; 25 lb, 139.40; 100 lb, 124.40; 400 lb, 122.00; 5200-19,600 lb, 109.80; 20,000 lb or more, 97.60.

Stannous Sulphate: Less than 50 lb, 136.80; 50 lb, 106.80; 100-1900 lb, 104.80; 2000 lb or more, 102.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page 225*)

are moving upward, but others have been marked down.

Seattle—The scrap market continues active. Receipts are in good volume, attracted by high prices. Both domestic buying and purchases for foreign account are heavy.

Los Angeles—The scrap market is bullish, with prices holding recently established peak levels. Offshore shipments have slackened slightly, but domestic buying is heavy.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 221

Inland Steel Co. recently awarded the Kopper Co. a contract for two coke oven batteries to replace batteries 4 and 5. Work starts next June, and completion is scheduled for November, 1958. When completed, Inland will have 26 additional coke ovens, bringing its total to 531.

CLASSIFIED

Help Wanted

COMBUSTION OR INSTRUMENT TECHNICIAN for supervisory position in small integrated steel plant. Open Hearth and Heating Furnace experience preferred. Please state age, experience, and qualifications in reply to Box No. 493, STEEL, Penton Bldg., Cleveland 13, Ohio.

CHIEF DESIGN ENGINEER—Mechanical Engineer degree preferred—Broad experience required for design of facilities for integrated steel plant located in Southwest. Excellent opportunity in a well established, fast expanding organization. Pension plan, group hospitalization, vacation, sick leave, etc. Submit complete personal and professional resume in first letter. Reply Box 496, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR SALE OR RENT

1—American Terry Model 1-75 Steel Erectors Guy Derrick, 85' mast, 75' boom. Rated 15-ton @ 30' radius.

2—100-ton capacity steel gin poles, 112' 8" high. Boxing 48" square, corner angles 4 x 4 x ½", with 27' 6½" balance beam. Weight 31,000 #.

1—100 KW Ideal AC Generator, 127/220/-230/400/440 Volt, 3 ph. 50 or 60 cycle, with Hercules DNX diesel engine, skid mounted. Weight 16,170 #.

15 KW, 20 KW, 25 KW gas- and diesel-driven generators for rent or sale.

1—Manitowoc Model 3500 Diesel Crane, 100' boom, 30' jib, Caterpillar D-17000 engine, 60-ton cap. Thoroughly rebuilt.

WRITE FOR NEW ECA STOCK LIST NO. 456

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Niles Boring & Turning
Engine Lathe—Rapid Traverse
100 HP.—Weight 200 Tons

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(details and photograph)
Upon Request
Write/Call

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STEEL DISTRIBUTOR
WAREHOUSE PLANT FOR CASH

REPLY BOX 494, STEEL
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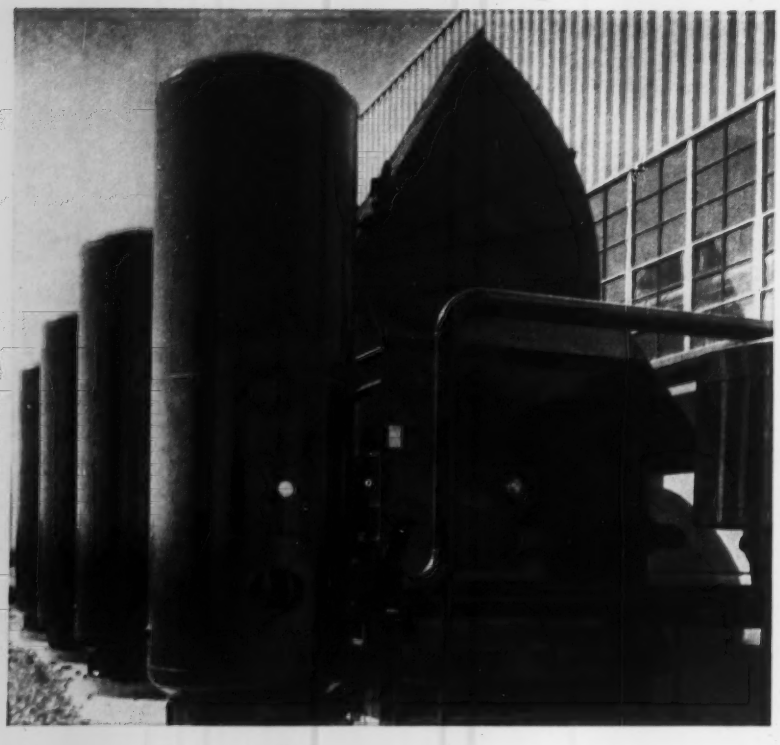
PRODUCTION MANAGER

REPUTABLE METAL WORKING COMPANY HAS OPENING FOR A PRODUCTION MANAGER EXPERIENCED IN PRODUCTION SUPERVISION WITH THE POTENTIAL TO BECOME VICE PRESIDENT FOR MANUFACTURING. ENGINEERING DEGREE DESIRABLE BUT NOT ESSENTIAL. EXPERIENCE IN METAL WORKING OR ALLIED INDUSTRY REQUIRED INVOLVING FORGING, BLANKING AND FORMING AND METAL FINISHING. PRODUCTION CONTROL EXPERIENCE IS DESIRABLE. EXCELLENT SALARY AND WORKING CONDITIONS. POTENTIAL FOR PERSONAL PROGRESS. FORWARD RESUME OF EDUCATIONAL AND EXPERIENCE BACKGROUND TO BOX 495, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.



HOW YOU SAVE,
Getting Drier Compressed Air

● Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

Write for complete information; ask for Bulletin No. 130

NIAGARA BLOWER COMPANY

Dept. S, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

INDUSTRIAL COOLING HEATING • DRYING

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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

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When product designs for welded steel

Have twice the rigidity... three times the strength

Yet require less material ...cost less to fabricate

WHY

aren't all your products designed for welding?

THE BETTER WAY costs 10% less

...yet this base is more rigid, holds closer alignment of machine spindles.

Photo courtesy Lees Bradner Company, Cleveland, Ohio.

Write

THE LINCOLN ELECTRIC CO.

Dept. 1625 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Call your AIM*... as Alcan did...

Steel strapping aluminum ingots aids customers

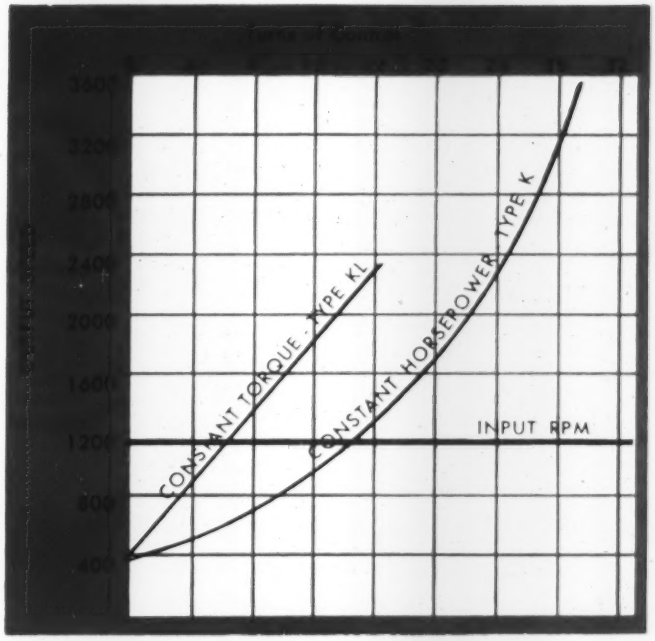
Acme Idea Man, Art Rochette, worked with Alcan technical men on this problem.

ALUMINUM COMPANY OF CANADA, LTD., Montreal, P. Q., modified its method of bundling ingots and improved freight car bracing techniques for added customer service. The new procedures insure delivery of intact, easily-handled bundles of ingots at Alcan's customers' plants. This lading protection advance is an example of how Alcan technical men and the Acme Idea organization cooperated to determine and prove a better packing and shipping method. (Idea No. S3-1.)

As a result of the Acme Idea method, 41 aluminum ingots are securely nested and bundled with Acme Steel Strapping. Using new freight car bracing techniques that help prevent disruption, the bundled ingots arrive at destination intact and are easily handled by lift truck. Car loading is faster and easier while unloading and storing by Alcan's customers is speeded up, more economical.

***Call your Acme Idea Man.** He will be glad to show you his file of time and money saving ideas. Write: Dept. SDS-126, Acme Steel Products Division, Acme Steel Company, 2840 Archer Ave., Chicago 8, Ill., In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Avenue, Toronto 13, Ont.

ACME STEEL STEEL STRAPPING



CLEVELAND SPEED VARIATOR

Accurately Provides Dependable, Infinitely Variable Speed Control

ANNOUNCED late in 1954, the new Cleveland Speed Variator met instant, enthusiastic acceptance. Engineers and designers of industrial equipment already have put thousands of units into use on such varied equipment as cigarette making machines, textile machinery, metalworking machinery, pharmaceutical equipment, transfer tables, conveyors and experimental and testing equipment of many types.

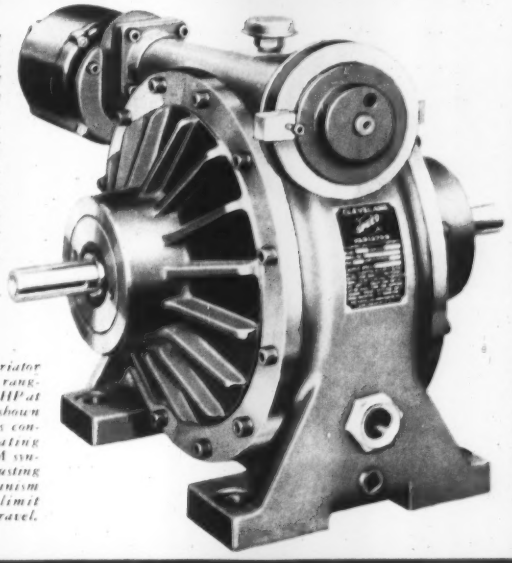
Infinitely variable, the Cleveland Speed Variator gives stepless speed over a full 9:1 range—from ⅓ to 3 times input speed. Output speed can be adjusted by either a hand wheel on the Variator or by manual or automatic remote control.

The Cleveland Speed Variator offers these major advantages:

1. An extremely compact unit with input and output shafts in line and rotating in the same direction.
2. Almost any input speed up to 1800 RPM can be used—either clockwise or counterclockwise rotation.
3. Rated for constant horsepower output over a 9:1 or 6:1 range; or for constant output torque over a 6:1 range.
4. Speeds infinitely variable over entire range of adjustment.
5. No slippage—positive torque response mechanism adjusts in direct proportion to the loads encountered.
6. Long life and minimum maintenance due to absence of belts or complicated linkages.
7. Ample bearing support for overhung pulleys on both input and output shafts.

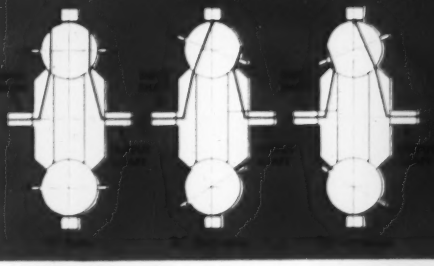
Write for Bulletin K-200 for detailed description with photographs, sectional drawings, rating tables and specifications.

Typical speed regulation curves for the Types K and KL Variators. Type KL offers a linear speed regulating pattern, often an advantage in automatic control applications. Output speed regulation of the Type K Variator follows a geometric progression pattern. Starting at the minimum output speed, each turn of the speed regulating wheel produces a fixed percentage increase in output shaft speed.



The Cleveland Speed Variator is available in 18 models ranging from fractional to 16 HP at 1750 input RPM. Unit shown at right, used in process control, has speed regulating worm driven by 75 RPM synchronous motor, with adjusting shaft indicating mechanism modified to actuate limit switches to prevent overtravel.

HOW THE CLEVELAND SPEED VARIATOR WORKS



Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts.

Relative speeds of the shafts are adjusted by changing the positioning of axles on which the balls rotate (diagram, right, shows cutaway Variator with hand regulating wheel).

"It's the Drive That's on the Ball."

THE CLEVELAND WORM AND GEAR COMPANY

Speed Variator Division, 3270 East 80th Street, Cleveland 4, Ohio

Sales Representatives in all major industrial markets • In Canada: Peacock Brothers Limited.

WEAN CONTINUOUS STRIP ANNEALING LINES

WHEN *Experience* COUNTS

Two of five Wean Continuous Strip Annealing Lines installed in a Pittsburgh district mill.

Ninth Wean Engineered Line Sets New Record

The ninth Wean designed continuous strip annealing line for silicon and tinplate products is now in the process of construction. This means that Wean has engineered more of these lines than all other firms combined — a record in every sense of the word.

The reasons for this Wean leadership are many. For example, the Wean design permits maximum speed and production while providing an excellent bright annealed product of uniform surface. And, users of Wean continuous lines report better metallurgical control, better temper mill operation with elimination of stickers, better delivery and a reduction in process inventory.

★ Wean also has designed and built 11 Stainless Steel Continuous Annealing Lines — also a record in the industry.

58

THE WEAN ENGINEERING COMPANY, INC. WARREN, OHIO